AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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AUGUST, 1922

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An Express Package or a Carload

At its Branch Offices, located at the representative centers of the dyestuff using trades, the National Aniline & Chemical Company, Inc., maintains in ample volume stocks of those dyes most usually called for by the local trades.

From these stocks prompt deliveries are made on orders calling for one pound in some cases, to fifty thousand pounds in others, to meet the needs of manufacturers who use color in their daily operations.

National Aniline and Chemical Co., Inc.

New York | *Chicago* | *Charlotte* | *Toronto* | *Philadelphia*
Boston | *Hartford* | *Montreal* | *Providence* | *San Francisco*

NATIONAL DYES

Table of Contents, page 37. Buyers' Guide, page 286. Advertisers' Index, page 296.

"There's a Way Out of This Difficulty, Mr. Brown."

Anderson, salesman for Schuyler Mills, manufacturers of white goods, was speaking to his manager. The difficulty was, that in spite of every effort, sales were at such a low point that it had become a question of the advisability of closing down the Mill entirely. When Anderson saw that he had Mr. Brown's attention, he continued, "I was talking with one of the converters in New York last week and he told me that the Kenesaw Mills are making colored goods now and I believe that's the thing for us to do."

"Whoa, there!" interrupted Mr. Brown, smiling indulgently, "I don't necessarily expect a salesman to know it, but just the same, it's a fact that if we went into the colored goods business, we'd have to install beamers and hire skilled operators to run them. The Kenesaw Mills are welcome to the business if they have gone to that expense. I wouldn't think of it in these uncertain times."

"Just a minute, please, Mr. Brown," answered Anderson, "I was about to explain that the Kenesaw Mills are making colored goods without having spent a single dollar for new equipment or additional labor. You see, they have their dyeing done by the Franklin Process. They ship their yarn to the Franklin Process Company on spinning bobbins, cones or parallel tubes, the Franklin Process dyes it and returns it to the Mills on parallel tubes already for use in the V creel for warping."

"By Jove. That's so," exclaimed Mr. Brown, "I'd forgotten that the Franklin people dyed yarn in package form. That makes it just as easy for us to make colored goods as to make white goods. Anderson, I apologize for laughing at you."

Anderson accepted the apology with a smile and then continued eagerly, "This same converter also said that he hadn't seen anything to equal Franklin dyed goods for brilliancy, solidity and fastness of color, and that he insisted on Franklin colors for all his goods. He showed me a Franklin color card, too, and after seeing that card I could readily understand his enthusiasm. And all the other converters that I called upon seemed to feel the same way about Franklin colors."

"If we use this Franklin Process, Mr. Brown, I can't see any reason why we shouldn't get into the colored market with a bang, because the converters are all strong for it."

"All right, Anderson," said Mr. Brown, "You've started this thing and I'm going to let you see it through. Get the nearest office of the Franklin Process Company on the wire right away and ask them to send immediately their latest color card with prices and all the information that we should have in order to do business with them."

The Franklin Process Company solicits **your** inquiries also.

FRANKLIN PROCESS CO.

Philadelphia PROVIDENCE Manchester, Eng.

New York Office, 72 Leonard Street

SOUTHERN FRANKLIN PROCESS CO.

Greenville, S. C.

NORTHROP

TRADE-MARK REG U S PAT OFF

LOOMS

ON COTTON GOODS

AND MOST WORSTEDS THAT CAN BE WOVEN

WITH ONE SHUTTLE

SAVE 50 TO 75 PER CENT

OF THE LABOR COST OF WEAVING

AND

PRODUCE BETTER GOODS

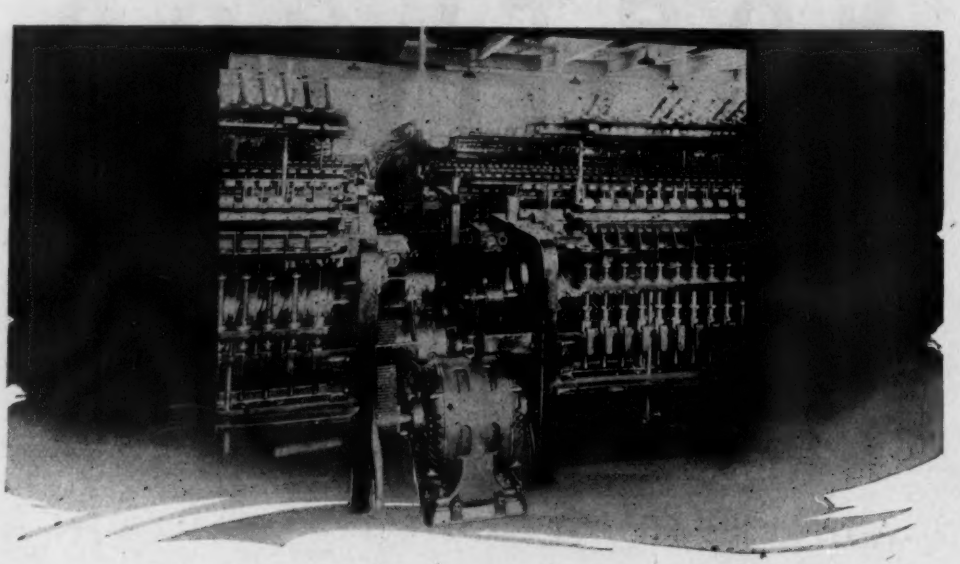
DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

ATLANTA GEORGIA

Copyright 1917 by Draper Corporation

SKF



Why Increase Fire Risk and Oil Damage
When Installing Individual Drives

IT is vitally important where individual motor drive is used, that the bearings on the numerous motors be oil-tight, for oil damage, lubricant costs and fire hazard become greater as the number of motors used increases.

Motors equipped with SKF marked, self-aligning ball bearings do not leak oil, for felt washers effectively seal the housings. And since only a little oil is required once every three or four months, lubrication costs are reduced 80 per cent.

Furthermore, as self-aligning ball bearings are practically frictionless, no appreciable bearing wear occurs during the normal life of a motor. Bearing take up and adjustment are, therefore, unnecessary and burn outs due to dropped armatures cannot occur.

Realize these economies and at the same time save on the floor space required, by specifying ball bearing equipped motors.

THE SKAYEF BALL BEARING COMPANY

Supervised by SKF INDUSTRIES, INC., 165 Broadway, New York City

797

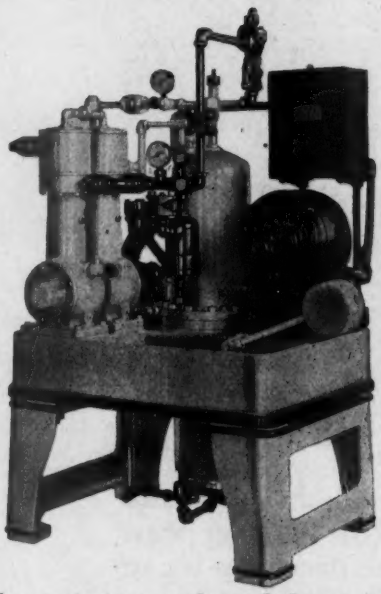
Normal View

Deflected View

BALL BEARINGS
The Highest Expression of the Bearing Principle

Lipman

FULL-AUTOMATIC REFRIGERATING MACHINES



Keep Up the Efficiency of Your Employes

These hot summer days have a very noticeable effect upon your workers. The heat tends toward making them sluggish and discontented, which quite naturally reduces their efficiency.

It is remarkable how much a cool drink of sparkling water increases their vitality.

But, this water must not be too cold, and its temperature should not vary. Drinking water of varying temperature has a very injurious effect upon the human system. Water of the same temperature without the slightest variation will keep your employees at their best at all times. It gives them renewed energy, new ambition and clearer brains.

The LIPMAN AUTOMATIC operates absolutely without attention, except an occasional oiling. No special operator necessary—just set the thermostatic control and the machine operates itself.

Eliminate the old system of individually iced water tanks. Ice costs too much, and the cost of handling is excessive. Let these unnecessary wastes of money pay for the LIPMAN.

The LIPMAN AUTOMATIC is guaranteed—money back if you are not entirely satisfied.

THE LIPMAN AUTOMATIC IS DESIGNED so as to be installed as separate units; the capacity of each unit is listed below. By these means we are in position to make the largest installations desired, as well as the smaller—saving the enormous expense of one tremendous central unit supplying all your workers and, at the same time, guaranteeing to you a constant supply of cool drinking water at much lower operating, as well as initial cost. These figures are based on supply water at 85° being cooled to 50° on 12 hour operation—taking into consideration the excessive requirements of the Textile Industry.

Machine Model	H.P. Motor	Machine R.P.M.	Dimensions Length	Width	Height	Water Cooling Capacity	Allowing 2 gal. per day per man	
700	1	350	36″	22″	58″	500 Gal.	250	EMPLOYEE
1400	2	350	37″	31″	61″	1000 Gal.	500	"
2800	3	350	67″	20″	58″	2000 Gal.	1000	"
5000	7½	350	60″	30″	60″	5000 Gal.	2500	"

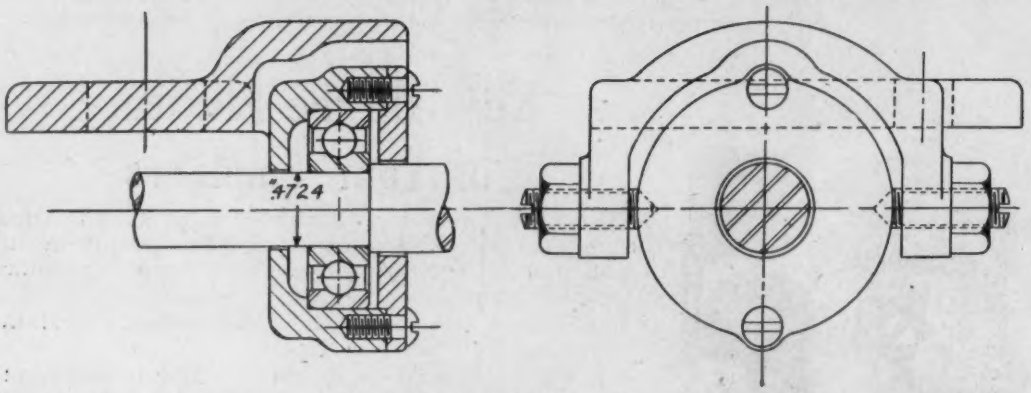
Installation of a LIPMAN REFRIGERATING MACHINE in your mill will prove a profitable investment, that will show increased efficiency, attractive saving over the cost of "icing" water coolers and general sanitation and increased morale among your employees.

Why not let our engineers consult with you?
Just drop us a card today—no obligation incurred.

Miles Refrigerating Company

292 Peachtree Street, Atlanta, Georgia

FAFNIR



You Can Get Much Better Results With Fafnir Ball Bearings

Fafnir Ball Bearings can easily be applied to your machines. They save power and eliminate the starting peak; they prevent wear and do away with the necessity for repairs; heating is avoided and the fire risk from that source is removed; they save time and oil, and solve the problem of soiled goods.

With specific reference to the warper (see accompanying cross section) the application of **Fafnir Ball Bearings** to the measuring roll insures easy turning of the roll and prevents the yarn from slipping on the roll, resulting in a perfect measure. In addition to the ball bearings, we furnish the housings and supporting brackets, and it is a simple matter to install them on your warpers.

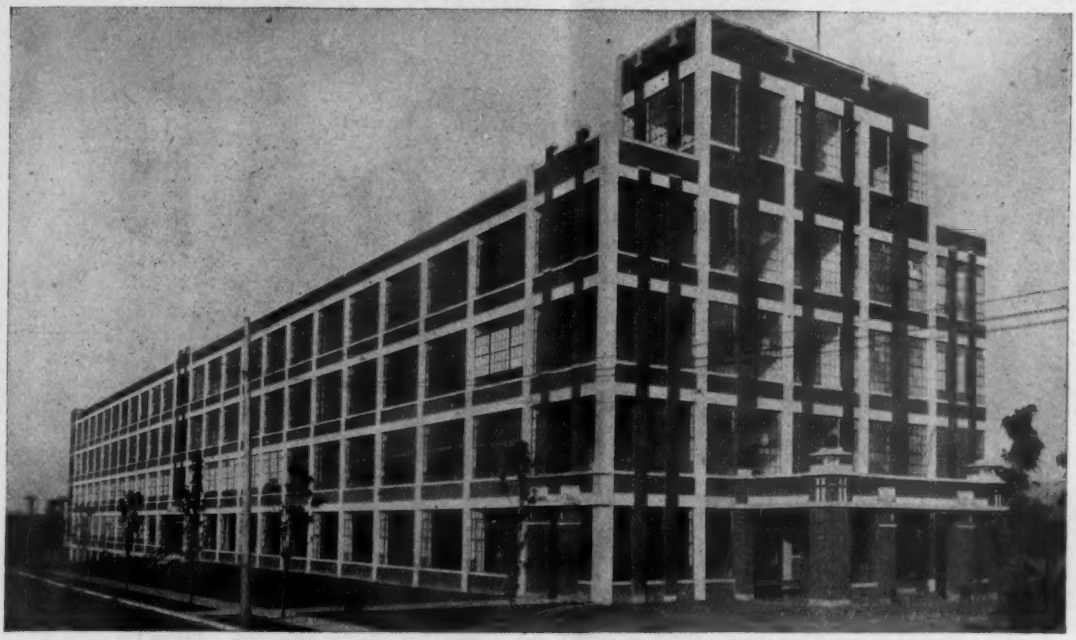
Our new catalog of **Fafnir Industrial Ball Bearings** is now ready for distribution.

THE FAFNIR BEARING COMPANY

Conrad Patent Licensee

New Britain, Conn.

Southern Representative, O. R. S. Pool,
P. O. Box 1375, Greenville, S. C.



NATURAL daylight cannot be improved upon. Nowhere is it more needed than in the textile mill. Abundant daylight means health and contentment, greater accuracy in workmanship and better supervision.

Truscon Steel Windows combine the most refined features of engineering and architect ural design. This is evidenced by the thousands of buildings in every industry in every part of the country in which Truscon Steel Windows are installed.

The Truscon Steel Company, the largest manufacturers of permanent building products in the world, maintains a large corps of engineers, familiar with every natural daylighting and ventilating problem. Their services are offered to you without the slightest obligation through forty-three engineering offices conveniently located in the principal cities throughout the country.

The textile mill shown at top of page is the Narrow Fabric Company at Wyomissing, Pa. It was designed by the Textile Machine Works, Reading, Pa., and constructed by Stone & Webster, Inc., New York.

TRUSCON STEEL COMPANY
YOUNGSTOWN OHIO
Warehouses and Sales Offices in Principal Cities.

TRUSCON STEEL WINDOWS

STAFFORD

AUTOMATIC LOOMS

For Wide Sheetings

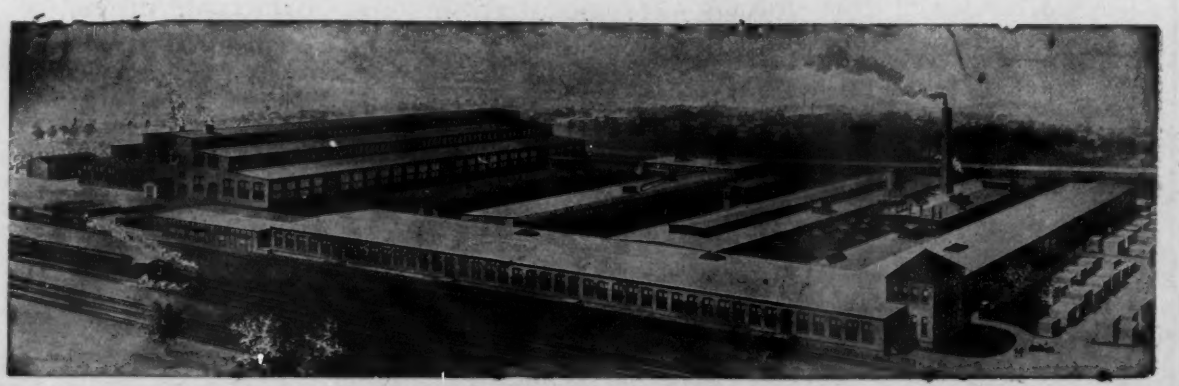
The Stafford broad loom is built to withstand severe service. Its simplicity, accessibility of parts and ease of operation are a few reasons why it is used by some of the most representative wide goods mills.

This loom embodies the high weaving qualities that characterize other Stafford looms and it can now be supplied with either shuttle or bobbin changing automatic features.

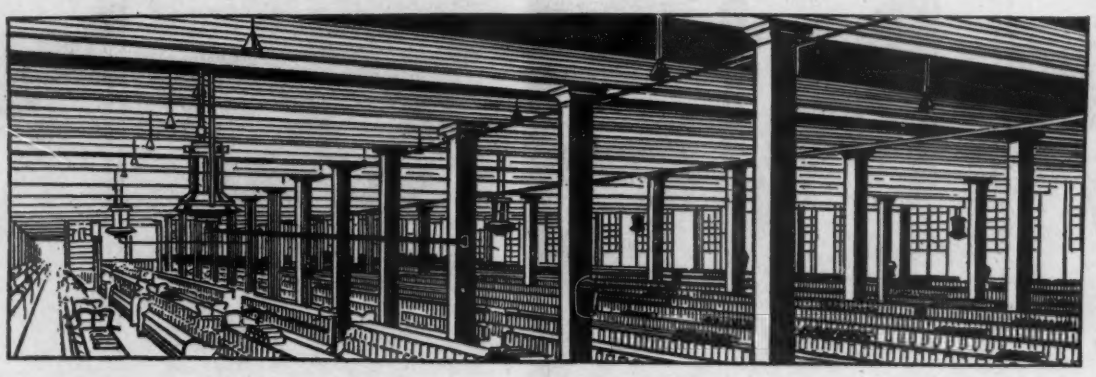
THE STAFFORD COMPANY

READVILLE, MASS.

Southern Agent, J. H. MAYES, Charlotte, N. C.



PLANT OF THE STAFFORD COMPANY, READVILLE, MASS.



Buying "Humidifiers Plus"

Our particular aim is not to sell Humidifiers but HUMIDIFICATION — *There's a big difference*

It's been a comparatively easy matter to sell humidifiers. Mysterious looking contrivances could be stuck up in a more or less haphazard way at different points in the room. That conditions were improved in some cases was due, not to any inherent efficiency in the systems themselves, but to the desperate need for moisture in the atmosphere in the rooms where they were placed.

Every Parks-Cramer installation is scientific. The guesswork of old humidifier practice has given way to KNOWLEDGE. It is now possible to get exactly the humidification required, regardless of the time of day—or year, the location of the mill, the peculiarities of construction or what not.

Many a mill man who has replaced his old "rule-o'-thumb" system with a Parks-Cramer system has been astounded at the results.

Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

New Developments In Card Drive

At the Fabric plant of the Mason Tire and Rubber Company, Kent, Ohio, Westinghouse has developed a geared, individual motor-drive for Cards.

Stripping, doffing, grinding, and the normal operation of the Card are satisfactorily performed by this individual drive.

In addition, line shafting, hangers and belting have been eliminated, and the maximum uniform speed secured, assuring greater production.

Westinghouse

Thus, the economies of individual motor-drive are brought to the Card—the only machine not previously individually driven with success.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.
Sales Offices in All Principal American Cities

Westinghouse

S

A Southern Ice Machine Installation in a North Carolina Plant

MAKE YOUR OWN ICE

SMALL ICE MAKING PLANTS HAVE PROVEN HIGHLY PROFITABLE FOR OTHER MILLS—WHY NOT YOURS?

You of course use ice—your operatives use ice. If more than $1.50 per day is spent for ice in your mill and mill village, it will prove a big-paying investment to install a "Southern" small ice plant, from 1 to 6 ton capacity depending on the amount of ice used in your mill and village. The savings effected over the cost of purchasing ice from outside sources will pay for the installation quickly, and then pay nice dividends throughout a long life.

With a small equipment you can make enough ice for your own use and can afford to sell ice to your operatives at a very low cost and save them money. All of them can then afford to buy ice to conserve their food. The result will be more healthful conditions throughout the village.

"Southern" Ice Machines are the most compact and economical machines on the market for the small ice making or refrigerating plant. In their design nothing has been overlooked to make them efficient and trouble-proof—almost automatic.

Without obligation we will be glad to send one of our representatives to your mill and submit drawings and specifications for a small plant best suited to your needs and conditions, giving you full data as to cost of installation and operation.

"Southern" installations have proven profitable investments for other mills—why not yours? Drop us a line requesting full literature today.

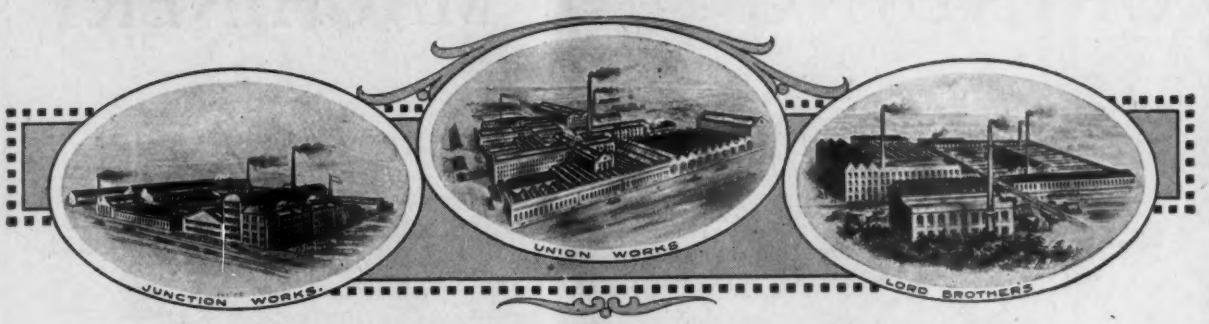
SOUTHERN ICE MACHINE CO., CHARLOTTE, N. C.

Southern

ICE AND REFRIGERATING MACHINE

S S

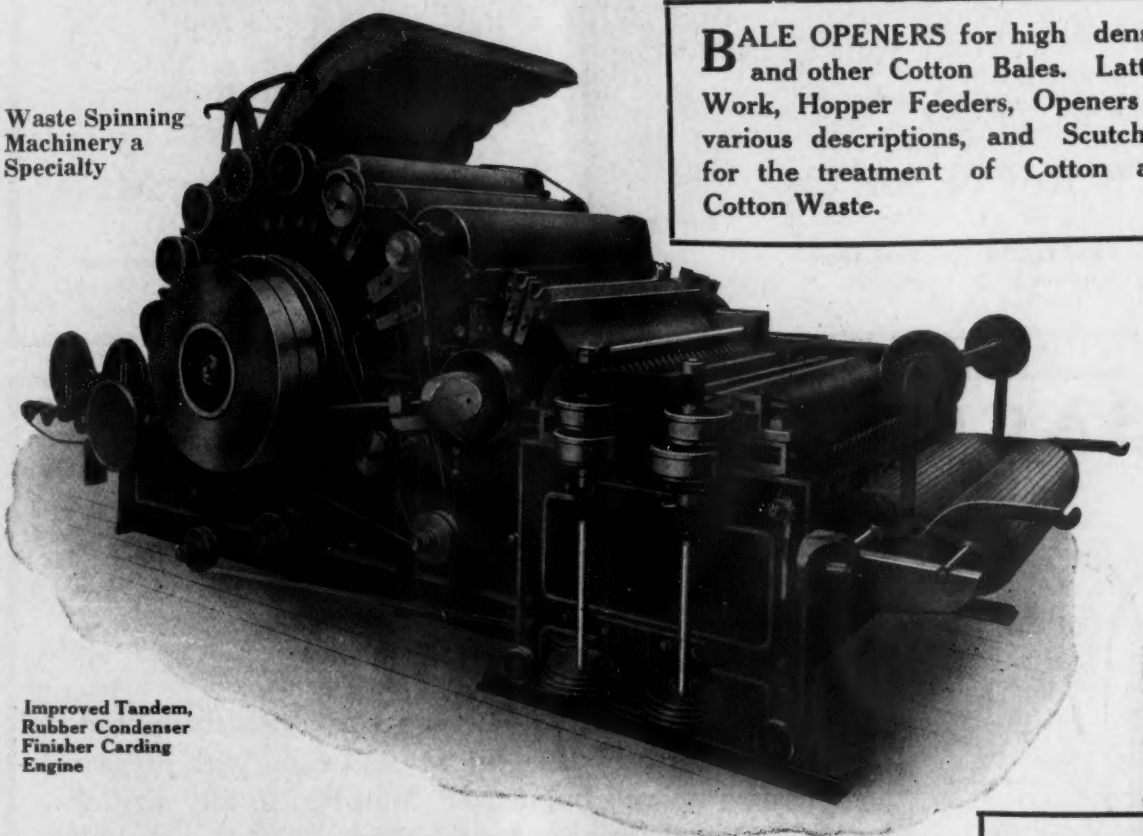
LORD BROTHERS



TEXTILE MACHINERY MAKERS

Waste Spinning Machinery a Specialty

BALE OPENERS for high density and other Cotton Bales. Lattice Work, Hopper Feeders, Openers of various descriptions, and Scutchers for the treatment of Cotton and Cotton Waste.



Improved Tandem, Rubber Condenser Finisher Carding Engine

IN EVERY country in the world where Cotton is manufactured Lord's Machinery has had a reputation for Efficient Service during the last 80 years. The sound construction and high-grade workmanship which has built up this reputation are at your disposal today.

Write for descriptive leaflet of the above, or any other of our productions in which you are interested.

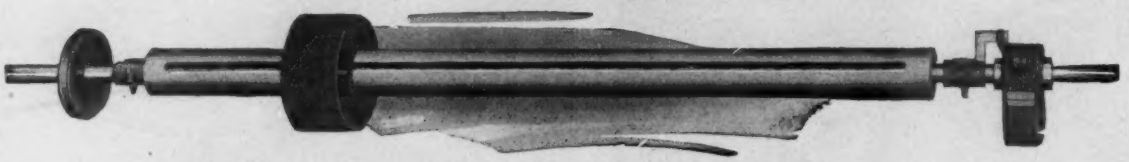
Cables: "LORD'S" Todmorden, Eng. **Codes: A.B.C.: 5th: Bentley's: Lieber's, and A-1.**

CANAL STREET WORKS, TODMORDEN, ENG.

INCORPORATED IN BROOKS & DOXEY (1920) LTD.

GRINDING MACHINERY

For Every Textile Grinding Need



Roy Grinders are made for every textile mill use and for textile mill use only. In the Roy line are machines for Grinding Cotton, Worsted and Woolen Cards, Nappers and Calender Rolls and Garnetts.

We will gladly give you full details. Write for Descriptive Bulletins.

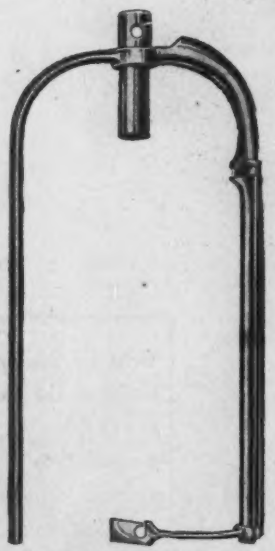
B. S. Roy & Son Co., Worcester, Mass.

ESTABLISHED 1868

E. M. TERRYBERRY, *Southern Agent*
1126 Healey Bldg., Atlanta, Ga.

Canadian Representative
W. J. WESTAWAY CO., LTD.
Hamilton, Ontario

SACO-LOWELL FLYERS
FOR ROVING FRAMES



A finished product of the highest quality. Made in our own shops by improved methods and tools. Thoroughly dependable and unconditionally guaranteed.

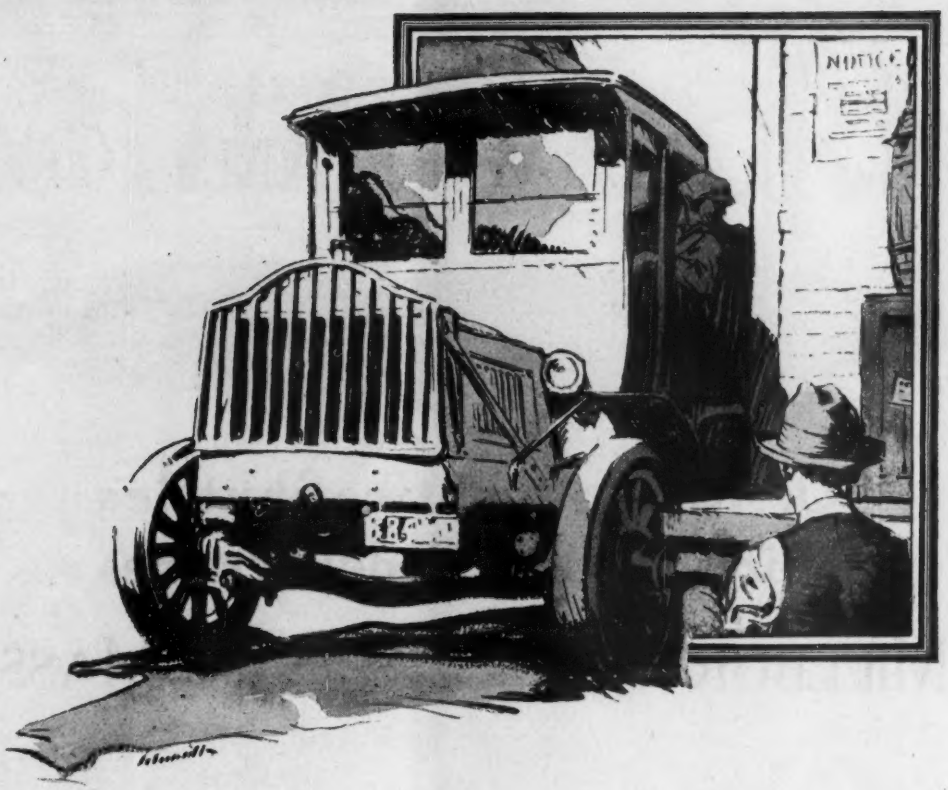
Interchangeable in every way with flyers formerly furnished. Uniform in weight with presser stiff and well balanced. Supplied in any size or quantity. Trial order solicited.

SACO-LOWELL SHOPS
IMPROVED TEXTILE MACHINERY

SHOPS AT

LOWELL, MASS. NEWTON UPPER FALLS, MASS. BIDDEFORD, ME.
Pawtucket Spinning Ring Co., Central Falls, R. I.
EXECUTIVE OFFICES: BOSTON, MASS.

ROGERS W. DAVIS, Southern Agent, CHARLOTTE, N. C.
Southern Branch Office: Greenville, S. C.



Packard Trucks Save Money

Decision to buy a Packard *must* be based—before all other considerations—on the Packard's established reputation for low costs over years of paying service.

The owners of thousands of Packard Trucks all over America, chose them for no other reason than their proven merit;—an intensely significant fact for all who are now, or will be, in the market for motor trucks.

This soundly founded preference for the Packard Truck is made even more pronounced by its price—recognized to be not only eminently fair, but also lower than that of other trucks of comparable quality.

ASK THE MAN WHO OWNS ONE

Packard Service

In 585 cities and towns throughout the United States, Packard Truck Service Stations give owners highly skilled service at a reasonable cost. Packard Truck costs, always low because the sound Packard construction minimizes the need of repair, are held still lower by this expert, broadcast service.

Packard Trucks range in capacity from 2 tons to 7½ tons; and in price from $3,100 to $4,500

PACKARD MOTOR CAR COMPANY, DETROIT

PACKARD TRUCKS

The J. H. Williams Co.

O. K. Automatic Shuttles
Wire Heddles, Heddle Frames

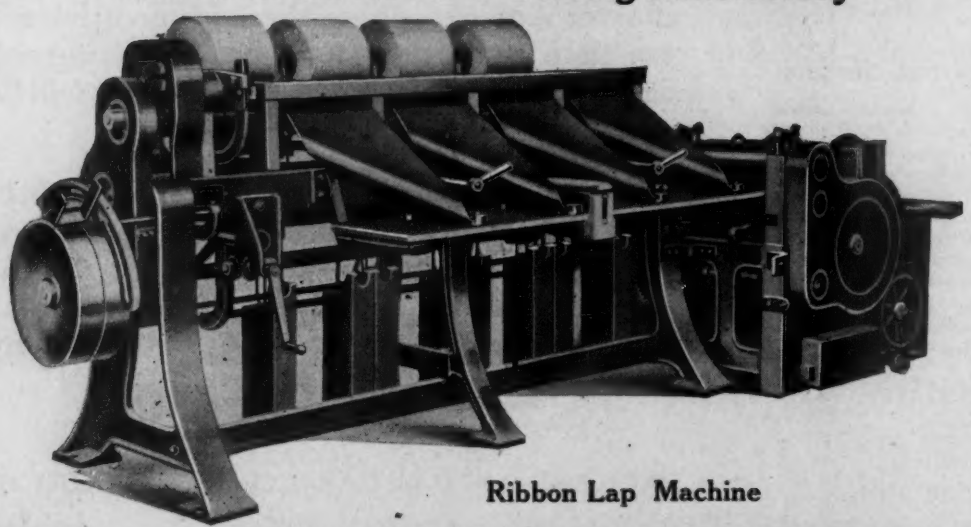
MILLBURY, MASS.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY

Manufacturers of Combing Machinery



Ribbon Lap Machine

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

White Trucks

PURCHASERS pay nothing for the "White" name—yet it is one of the most *substantial values* obtainable in the whole field of motor haulage.

It assures them permanent owner service.

It protects their truck investment.

It advertises their own delivery service.

It gives them the satisfaction of knowing beforehand that their truck *can do* the most work for the least money.

It assures them a good resale price.

Why pay as much for a truck without these values? Why experiment?

THE WHITE COMPANY
Cleveland

21 YEARS OF KNOWING HOW

"Everlastingly on the Job"

FROM sun-up to sun-down, and far into the night when necessary, SHAMBOW Shuttles keep "everlastingly on the job."

Every part of a SHAMBOW Shuttle is made under our own roof and measurements, spindle fit, etc., must be in exact accord with customers' specifications and requirements.

Each SHAMBOW Shuttle passes a close final inspection, and in every detail must reach the "SHAMBOW Standard" to get by.

Your shuttle bill will be smaller
Your interruptions will be fewer
Your production will be greater
Your product will be better

if you standardize on

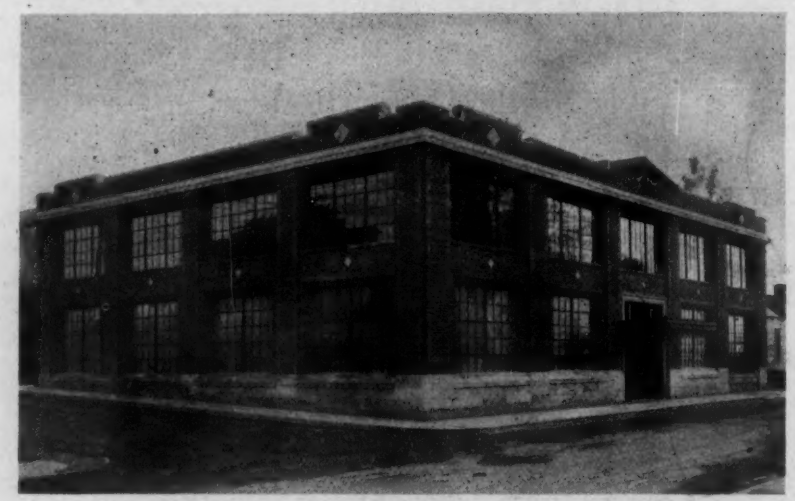
SHAMBOW

—*The Custom Built Shuttle*

SHAMBOW SHUTTLE CO., WOONSOCKET, R. I.

John C. Shambow, Pres. and Treas.

H. H. Ullman, V.-Pres. and Gen. Mgr.



New Southern Warehouse

Exclusively for

CROMPTON & KNOWLES PARTS

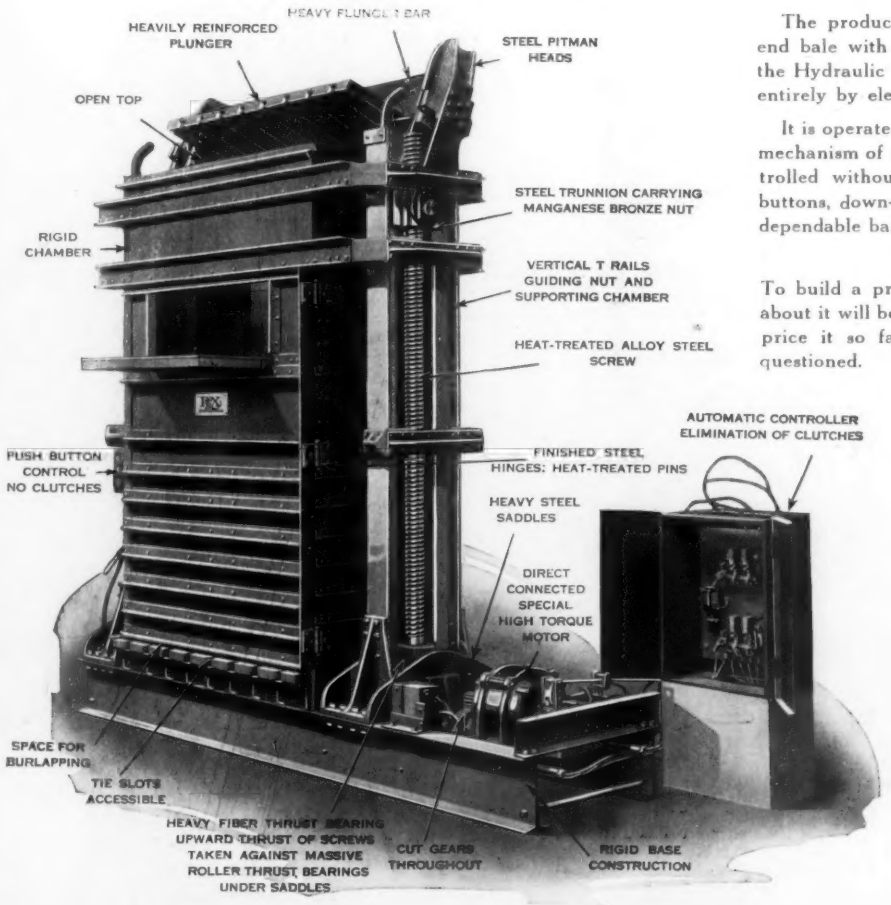
Large Stock Carried — Quick Service

Alexander & Garsed

Charlotte N. C.

Southern Representatives.

Announcing—Hydraulic Pressures Electrically Performed By THE "REX" BALER


HEAVY PLUNGER BAR
HEAVILY REINFORCED PLUNGER
STEEL PITMAN HEADS
OPEN TOP
STEEL TRUNNION CARRYING MANGANESE BRONZE NUT
RIGID CHAMBER
VERTICAL T RAILS GUIDING NUT AND SUPPORTING CHAMBER
HEAT-TREATED ALLOY STEEL SCREW
AUTOMATIC CONTROLLER ELIMINATION OF CLUTCHES
PUSH BUTTON CONTROL NO CLUTCHES
FINISHED STEEL HINGES: HEAT-TREATED PINS
HEAVY STEEL SADDLES
DIRECT CONNECTED SPECIAL HIGH TORQUE MOTOR
SPACE FOR BURLAPPING
TIE SLOTS ACCESSIBLE
HEAVY FIBER THRUST BEARING UPWARD THRUST OF SCREWS TAKEN AGAINST MASSIVE ROLLER THRUST BEARINGS UNDER SADDLES
CUT GEARS THROUGHOUT
RIGID BASE CONSTRUCTION

The product of the "Rex" is a small square end bale with all the compact qualifications of the Hydraulic Press, yet the "Rex" is controlled entirely by electricity.

It is operated by a powerful double screw type mechanism of unique design and electrically controlled without clutches by three simple push buttons, down—up—stop. The fastest and most dependable baler on the market.

The Rex Creed

To build a press so good that the simple truth about it will be adequate recommendation and to price it so fairly that its value can never be questioned.

We unreservedly guarantee 100% satisfaction. Descriptive literature on request.

REX ENGINEERING CORPORATION

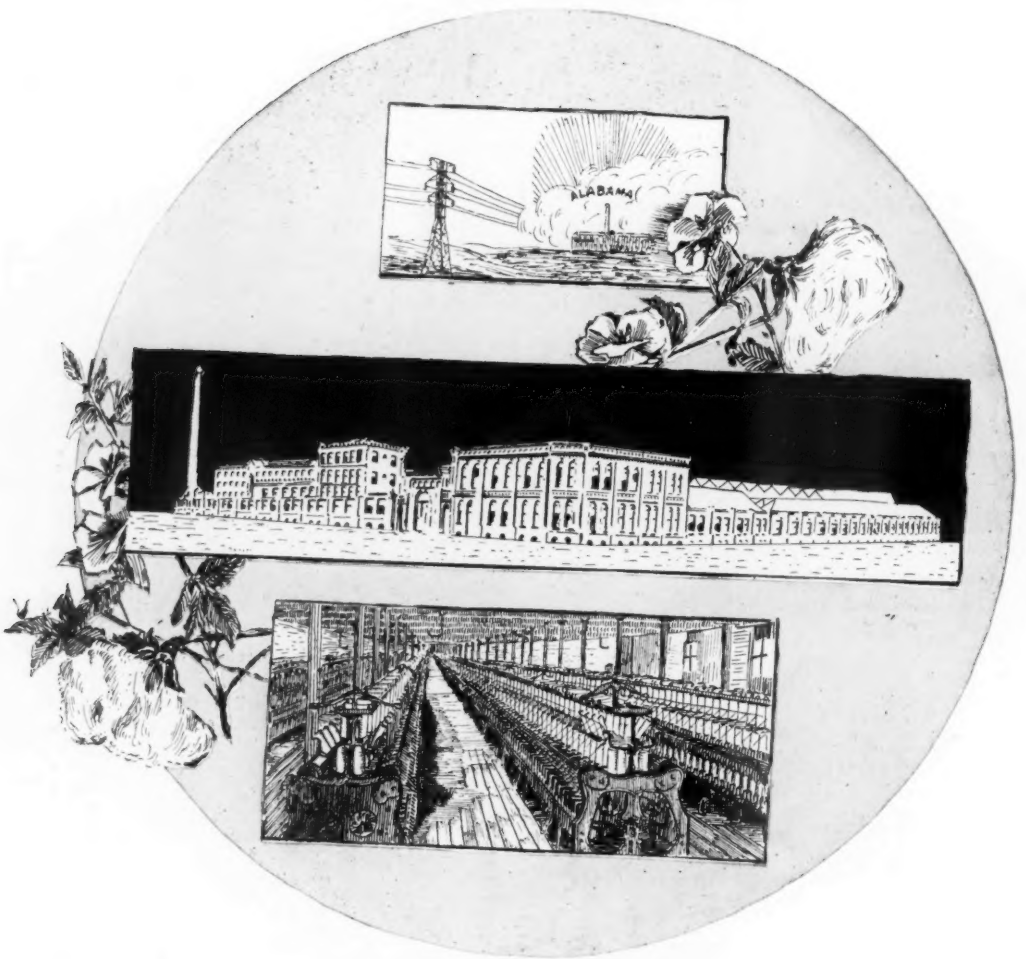
DUNKIRK, N. Y.

J. S. HULME

Southern Representative
Atlanta Trust Co. Bldg.

ATLANTA, GA.

Textile Mills Pros



ALABAMA POWER CO.

BIRMINGHAM, ALA.

per In Alabama

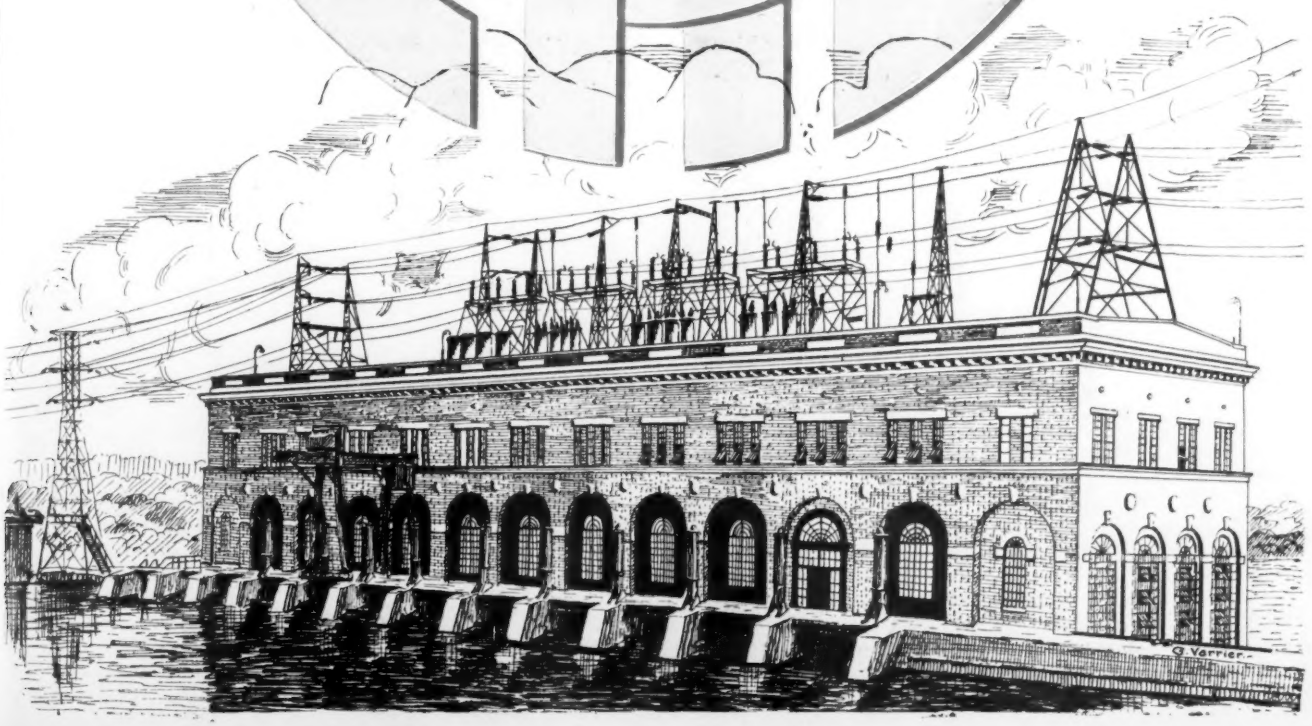
Economy In Manufacturing

Alabama is well located for economy in cotton goods manufacturing; being near the source of raw material; having dependable labor; convenient railways and shipping connections and economical and dependable hydro-electric power.

Good factory sites are abundant in Alabama, either in or adjacent to the corporate limits of cities and towns; located on main line railways, many having street railway service, water for domestic and industrial purposes, and all having ideal climatic conditions. Level factory sites may be secured at a purchase price not to exceed the average price paid for ordinary farm lands, and in some places these sites will be given free of cost to the reputable manufacturer.

Living conditions in Alabama are unexcelled. "An income of $2,000.00 a year in the South is worth about twice what it is in the great industrial centers of the North," says a recent editorial in the New York Sun and Herald. This is attributed to the climate and circumstances which make housing costs relatively low, fuel bills light, heavy and expensive clothing unnecessary, and food more plentiful and cheaper. This difference in the cost of living has been estimated by Mr. W. D. Adams, Secretary of the American Cotton Manufacturers Association to average $4.36 per week in favor of the Southern operative.

Detailed information will be furnished upon request.



THE FUNCTIONS OF THE ENGINEER

The Organized Plans and Efforts of the Engineer will Convert Natural Resources into Successful Industrial Enterprise

THE full value of raw materials like cotton, wool, silk, ore, coal and agricultural products is obtained only by their conversion into the finished products that commerce delivers to satisfy human needs.

This task of conversion is one of the functions of the Engineer.

He selects factory locations with a view to the proximity and supply of these raw materials in relation to the other factors that enter into the production of finished goods and the market for them.

Then he designs the plants for his clients to operate, so that they may secure the profit to which they are entitled.

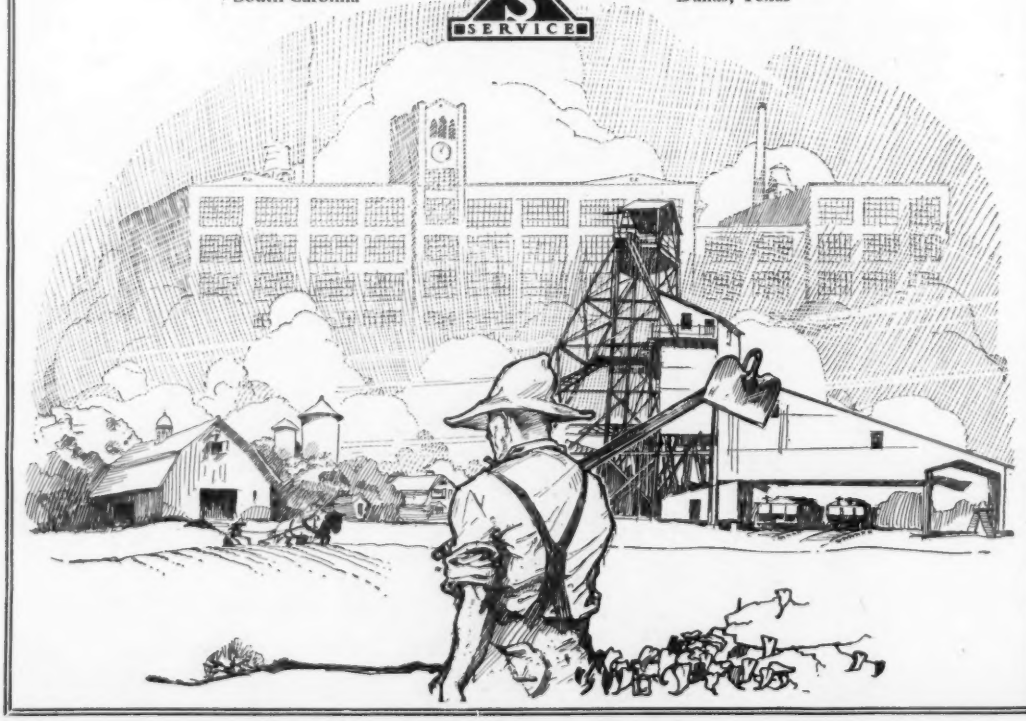
If you are interested in bringing greater stability and prosperity to your community, you will want to write for two interesting books,—"Picks to the Minute," (Textile) and "Factories for the Future."

J. E. SIRRINE & COMPANY
Engineers

Greenville
South Carolina

S
SERVICE

801 Insurance Bldg.
Dallas, Texas



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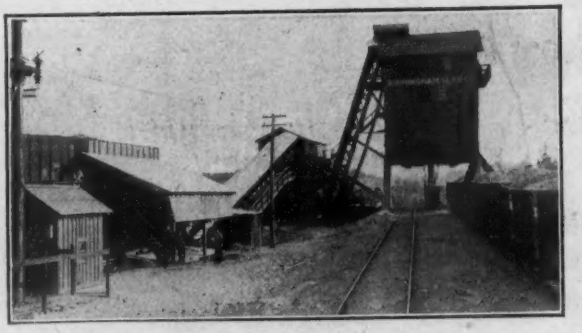

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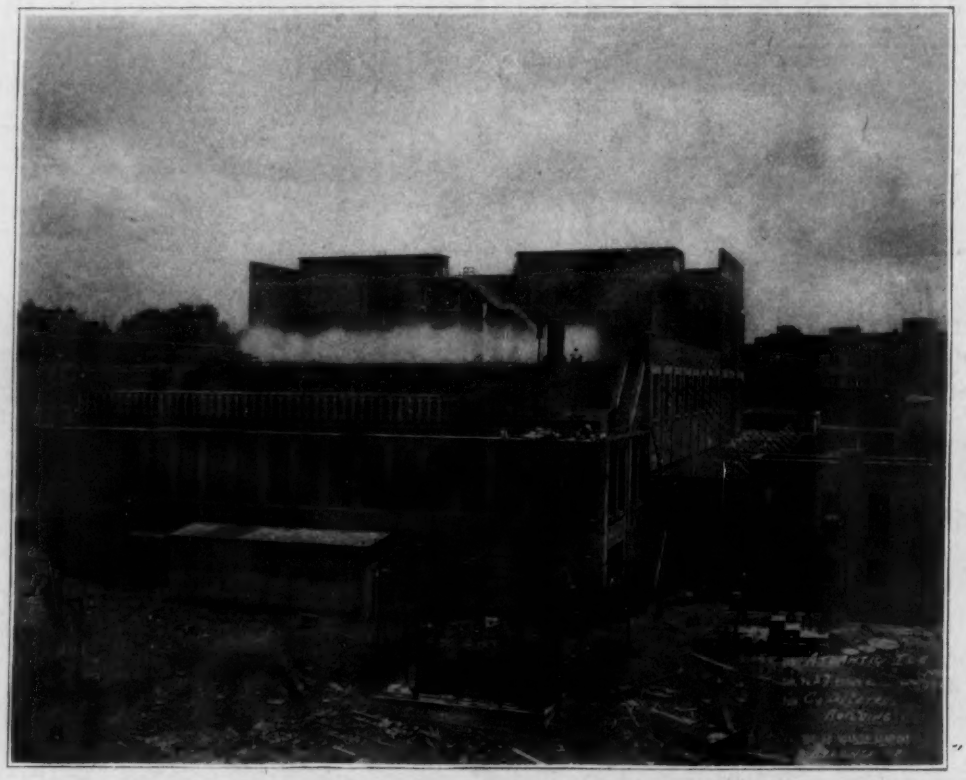

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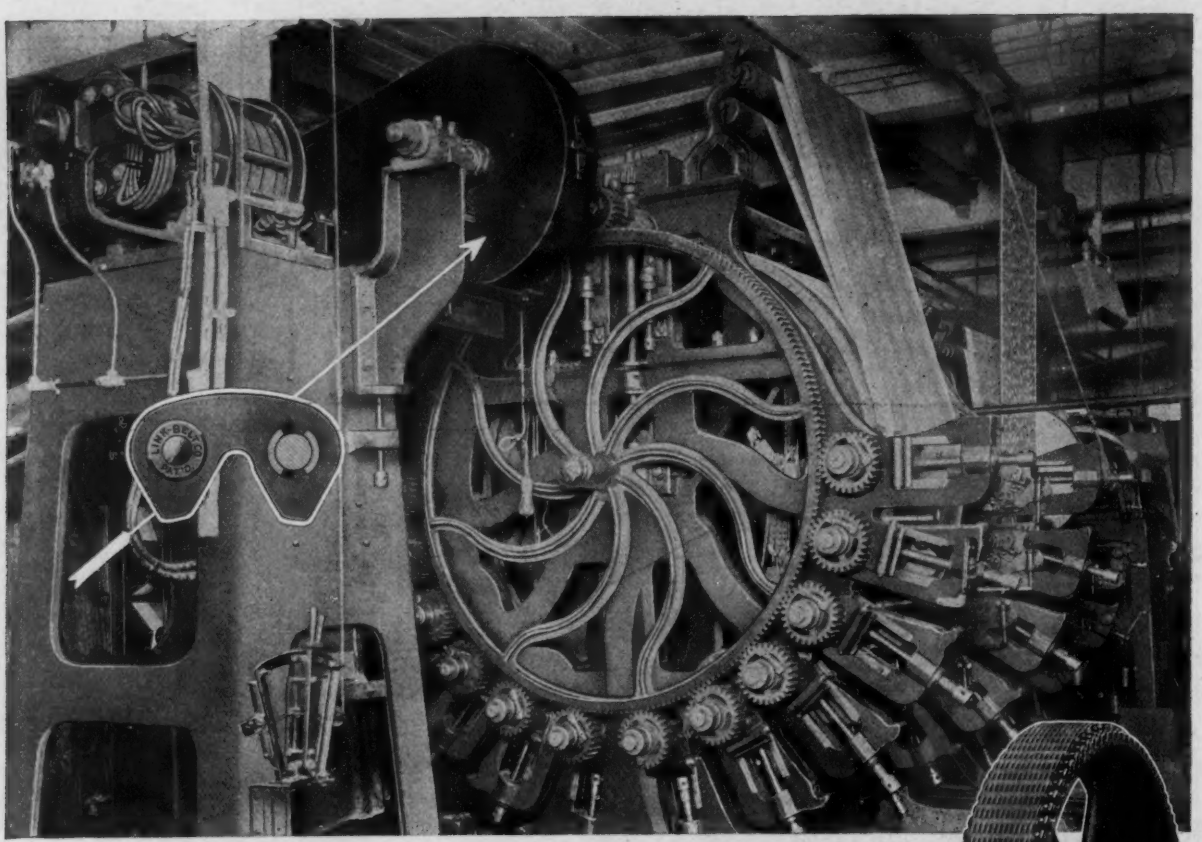

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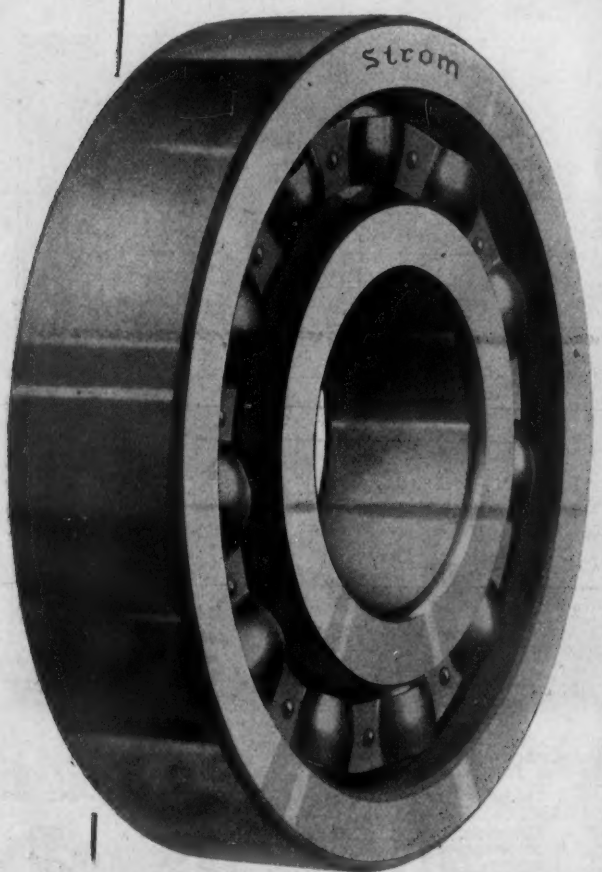

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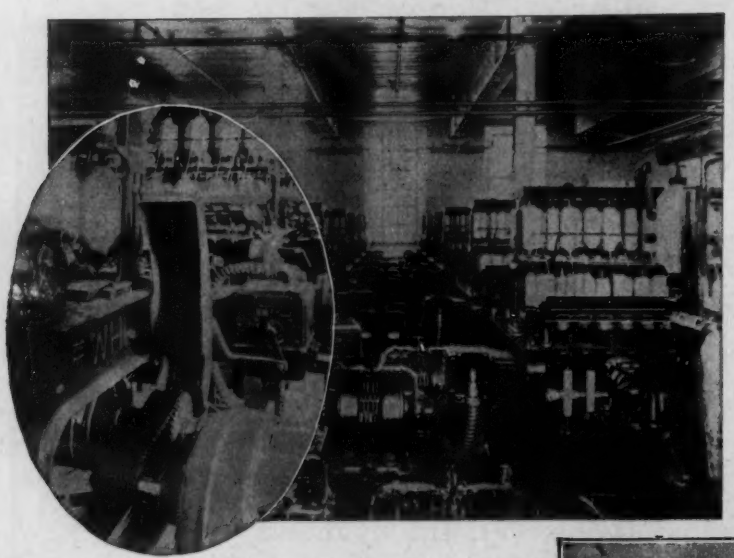

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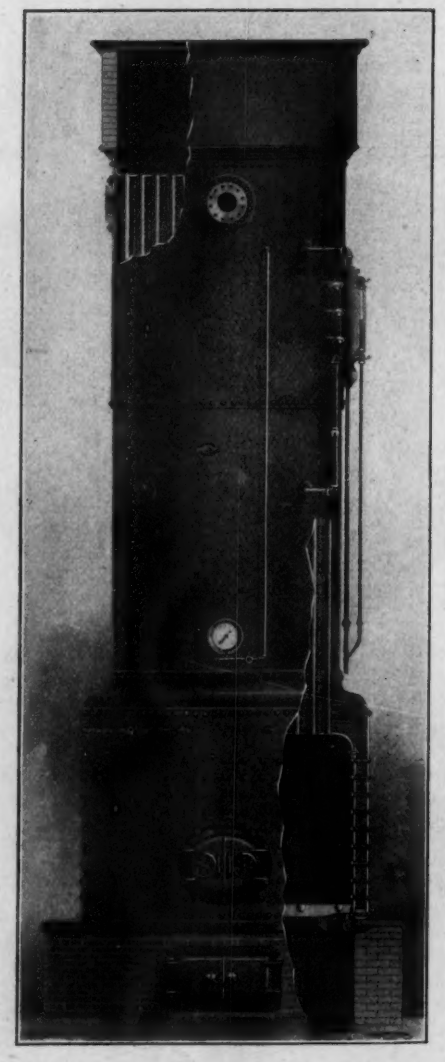

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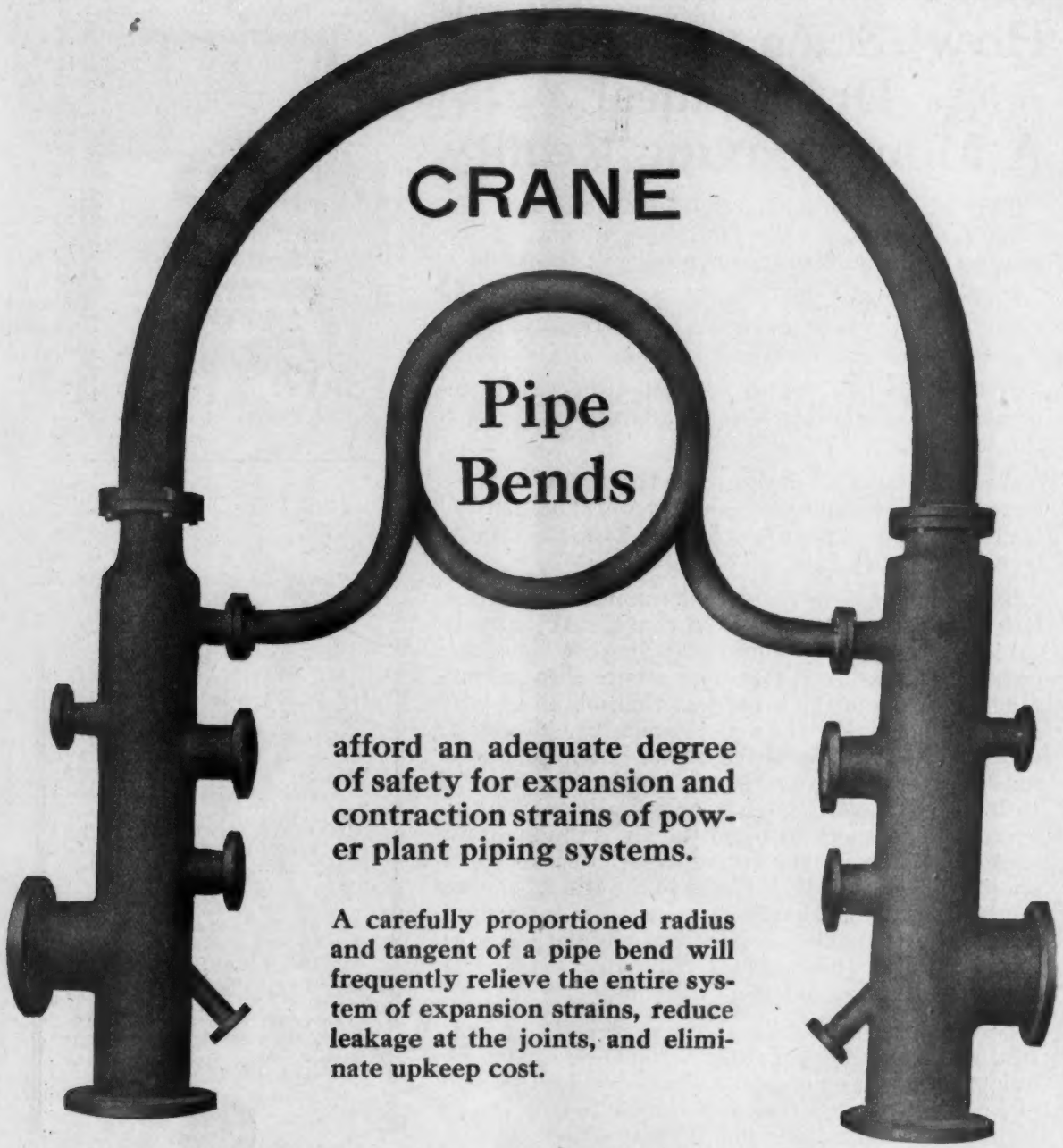

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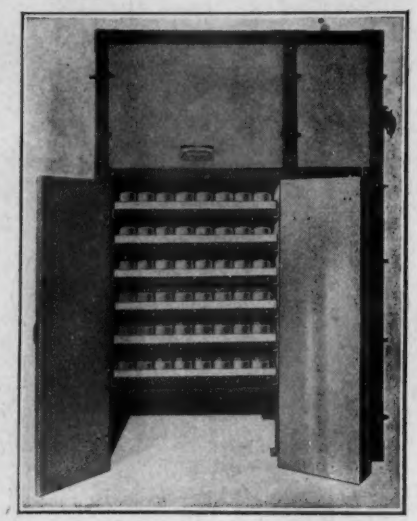

This dryer especially constructed for drying yarns that have been dyed by the Franklin Process, contains the strength and rigidity that have always been a feature of other Grinnell Textile Dryers.

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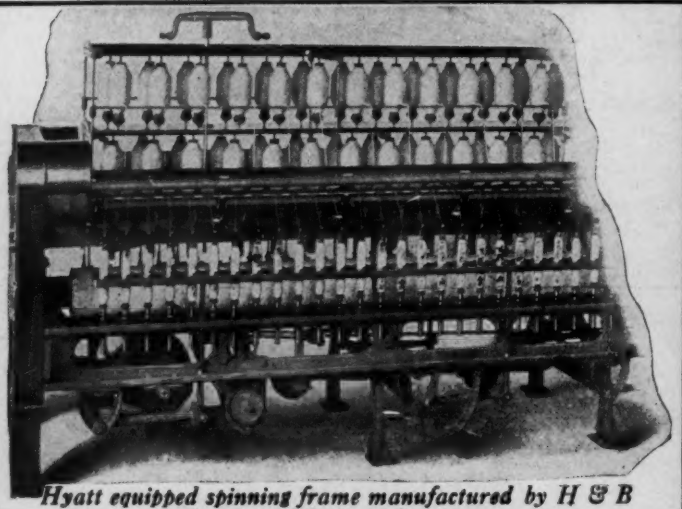


Hyatt equipped spinning frame manufactured by H & B American Machine Company.

A Real Spinning Frame Improvement

The H & B American Machine Company, Pawtucket, R. I., for many years manufacturers of spinning and twister frames, are now prepared to furnish their frames equipped with Hyatt roller bearings.

In line with their policy of utmost service to customers, they recommend that their customers specify "Hyatt equipped," because the use of Hyatt bearings on spinning and twister frames assures:

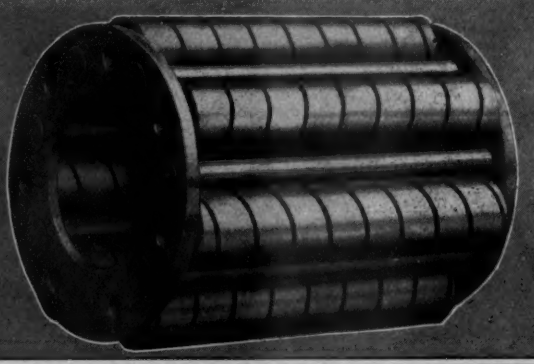
Power saving approximately 11%
Maintenance costs reduced to minimum
About 90% reduction in lubrication costs
Exceptional bearing durability

For your new spinning frames and twisters consider the advantages offered by Hyatt bearings and profit by the action taken by this long established builder of cotton machinery.

The same advantages can be realized by having these bearings applied to frames now in service. Write us or your frame builder for further information.

Hyatt Roller Bearing Co. Industrial Bearings Division **New York, N. Y.**

Motor Bearings Div.—Detroit
Tractor Bearings Div.—Chicago
Pacific Coast Div.
San Francisco



With The Publishers—

The Tariff on Chinese Eggs

It must not be supposed that china eggs all emanate from the Celestial Empire. They don't. A lot of them are manufactured right here in this country. Also there's a difference between china eggs and Chinese eggs. However, a Rhode Island Red biddy, with her heart and head intent on raising a family, will be quite as contented with eggs of the china variety. At least they look cleaner and probably smell better if broken. But we started to talk about advertising of a particular kind and that made us think of the tariff on eggs.

You have heard a great deal in the last few years about "general publicity" and "broadcasted advertising." This may be excellent for some products. It may be! But if you were making something for the cotton manufacturers, would you try to sell it to the whole population of the country or would you concentrate your efforts on the men who really have a use for your product?

There are approximately half a million people engaged in cotton manufacturing. Less than six thousand of these are proprietors, salaried officials, superintendents and managers—prospective buyers of your product. Would you aim at this six thousand or would you shoot broadcast at the whole 110 million people of the United States?

The census bureau shows that only thirty-eight millions of all these persons are engaged in gainful occupations. The Associated Business Papers have recently compiled from this group all the individuals, companies and corporations engaged in merchandising, in technical and professional services, in construction, in manufacturing, in transportation, and in public service and institutional work. They also included the medical, surgical, dental, and educational professions and such general services as undertaking, laundering, cleaning and building. Even with this wide selection the thirty-eight million is reduced to fourteen million. Of the 10,815,833 persons reported in 1919 as engaged in all kinds of manufacturing, less than a million and a half fall within the salaried employee class—the class that buy for the company.

A few years ago a firm selling a high quality of technical and professional service decided, on expert advice, to try general publicity advertising. They tried it fairly, paid good money for it, and then withdrew from that field and expanded in the business papers that went only to those actually interested.

"Did you receive many inquiries," we asked the head of this firm.

"Lots of inquiries," he replied. "Ninety-two per cent of them from students who wished aid in preparing a school thesis, and the other eight per cent from people who wished us to specify some especial product," he added.

Not a traceable order in the whole outfit!

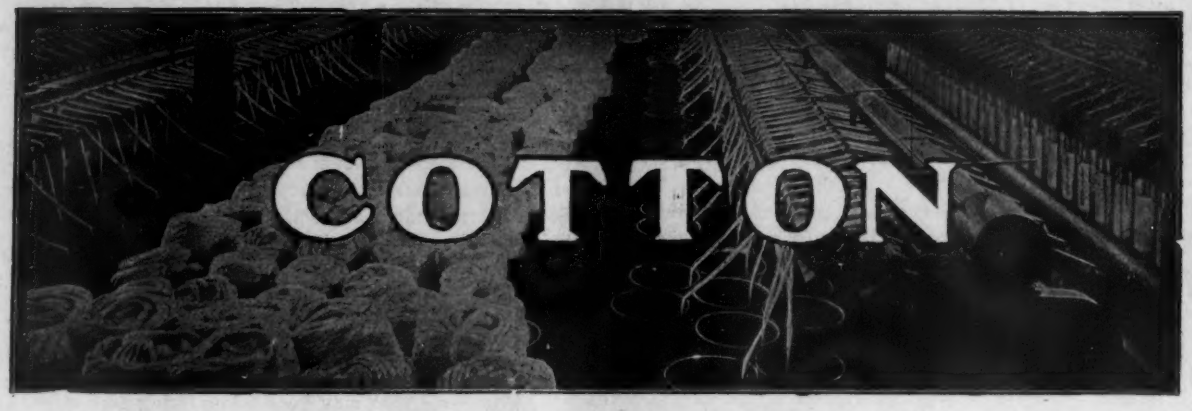
All of which brings us back to the original proposition that broadcasted advertising to great numbers of people, like the tariff on Chinese eggs, sounds well but doesn't mean anything.

AMONG COTTON'S READERS

H. B. Jennings
Vice-President and General Manager
Union-Buffalo Mills Company,
Union, S. C.

"The reading of textile publications is the most satisfactory way of keeping informed upon the cotton mill business. Matter pertaining to the textile industry in its various phases is available in unusually good balance in the magazine COTTON."

H. B. Jennings



August, Nineteen-Twenty-Two

Teaching Introspection.

Away back in September, 1913, we introduced the question in these columns, "Should Textile Schools Have a Human Nature Department?" The discussion centered around the question of management on the part of the foreman; on what was being done to instruct the foreman as to the best way to handle men and women in the mass. We pointed out that human nature, as it is commonly termed, includes all the original endowments or propensities that pertain to a person under natural rather than abnormal conditions; that many of these are characteristics acquired in early or later life; and as all of these things are controlled by the varying states of the human mind, a study of them resolves itself into a study of psychology, this being the science which classifies and analyzes such phenomena..

But we went at the question from the wrong angle. It seemed to us at that time that the textile schools were the proper medium to use, and the young students, in the formative period of their lives, the best material. Experienced textile school men responded by pointing out, in turn, that such instructors as their finances allowed them to engage were not men with years of practical superintendency behind them, as such men, with their ability to handle help, could command twice the salaries the schools were able to pay. They further indicated that in their opinion it would take practical, experienced, steady-thinking men to meet and solve the very grave situations that come to the surface from day to day in the handling of groups of operatives.

It then became apparent that in order to produce satisfactory results it would be necessary to get back to the fundamental principle that the study of psychology first takes up the study of the individual student—in other words, teach introspection. It is sometimes difficult to see that much progress is being made in work of this kind, because it is so much easier for the individual to see weaknesses and faults in the other fellow. However, some progress is being made in some schools, and in the meantime we have, with the aid of an experienced mill man, inaugurated a new feature in COTTON that seems to point the way toward something definite.

In March of this year, on page 341, we published the first of the philosophical talks under the caption, "An Old Timer Says—." In that particular article "Old Timer" leads up to the question, "Would You Hire Yourself for Your Job?," adding thereto some rather pertinent remarks. On July 3rd the superintendent of a southern mill, writing in to renew his subscription, especially mentioned that particular article and some results he had secured from it. Responding to our request for further information he writes under date of July 20th as follows:

"Your favor of the 5th has remained unanswered due to the fact that business conditions have improved to such an extent that we have had to start all our machinery and work overtime and I have been very busy in the mill.

"I am enclosing the list of questions compiled from the Old Timer article, "Would You Hire Yourself for Your Job," and I only regret that I have not been able to get the copy from one of my overseers who wrote an answer to same to be read at a meeting which we hold monthly with all the executives present. We drew slips of paper to determine as to who should write an article on this subject after I had read and presented the enclosed questions. This was suggested by our president who was greatly interested in these questions.

"I fully believe that all of us obtained inspirations by thus diagnosing ourselves, and that particular article in your publication has proven an impetus for better and greater efficiency on the part of our overseers. I have realized this ever since and wish to thank you for this splendid article."

The questions referred to by this superintendent are as follows:

1. Did you ever deliberately decide to break yourself of a habit, such as smoking or drinking, and succeed in doing it?
2. Do you control your temper and not "fly off the handle" when things go wrong?
3. Are you usually cheerful and free from grouchy spells?
4. Do you think for yourself and not let the opinion of others unduly influence you?
5. Do you "keep your head" in an emergency?
6. Do you remain calm when your own mistakes are pointed out to you?
7. Do your employees respect and cooperate with you?
8. Can you maintain discipline without often resorting to the use of authority?
9. Have you ever been selected to take charge of a group of dissatisfied men because of your ability to handle men?
10. Can you adjust a difficulty and retain the friend-

ship of the employees with whom you have differed?

11. Can you get men under you to do things without irritating them and causing them to be resentful of your authority?

12. Are you patient when dealing with help who are hard to please?

13. Can you meet opposition without becoming confused and saying things you wish afterward you had not said?

14. Are you sought out by your friends to handle delicate situations because of your ability to do such things?

15. Do you obtain and retain help easily?

16. Do you make it a rule not to quarrel about petty things?

17. When thrown with a group of strangers do you adjust yourself easily?

18. When talking to superiors do you feel free from embarrassment?

19. When interviewing subordinates do you put them at ease?

20. Are you able to get your ideas across without causing others to feel that you are overbearing or narrow-minded?

Across the bottom of this sheet of questions this superintendent had written, "Men are valuable just in proportion as they are willing to work in harmony with other men."

This is just the result we have been hoping for but, unfortunately, we seldom learn about such results except through accident. If other mill men have had similar experiences we would appreciate having them advise us of the details, not necessarily for publication but for our own information.

And right here we wish to call attention to the article on "Foremanship Training and Its Results" which appears on another page of this number of COTTON. This is carrying the same work along a little further and is getting nearer to what we were advocating in 1913. As this work is still in its infancy and as experienced educators are behind this movement it is probable that improvements will be noted from time to time, especially as the mill managements and the foremen who have tried out the proposition are almost unanimously enthusiastic over the results obtained.

The following statistics concerning the cotton manufacturing industry in China, which are the latest figures to be compiled on the subject by the Chinese Cotton Mill Owners' Association, will doubtless be of interest.

The number of spindles in operation at different times were as follows: August, 1920, 1,280,036; August, 1921, 1,552,950; and February, 1922, 1,732,632. In August, 1921, there were 120,000 spindles under construction, and, six months later, in February, 1922, there were 181,344 spindles in process of erection. This gives a total spindleage for the three dates as follows: August, 1920, 1,280,036; August, 1921, 1,672,950; and February, 1922, 1,913,976.

Figures showing the consumption of various classes of cotton during the three six-month periods from August, 1920, to January, 1922, follow: (These are 500-pound bales.)

	Chinese Cotton	Amer'n Cotton	Indian Cotton	Egyptian Cotton	Total Bales
Aug., 1920, to Jan., 1921	349,577	8,318	51,311	...	409,206
Feb., 1921, to July, 1921	378,715	20,804	67,718	...	467,237
Aug., 1921, to Jan., 1922	349,613	71,970	110,314	505	532,176

An Example of Southern Development.

It is extremely difficult for the average man to realize the vast and practically undeveloped area that constitutes the southern states. The term undeveloped is used advisedly as little more than twenty-five per cent of the South's five hundred and sixty million acres have already been placed on a producing basis. The great natural resources of this section are just beginning to be developed, while only during the last twenty years has its many opportunities for the favorable location of manufacturing plants been recognized by outside capital in any sizable amounts.

An example that may be cited as being typical of a number throughout the section, and one that is particularly apropos in that it is developing a natural resource for the benefit of an immense area of territory, is the properties of the Alabama Power Company. This company furnishes hydro-electric power, directly or indirectly, to the larger part of Northern Alabama, covering an area of approximately 25,000 square miles and an urban population of more than a million people.

To supply this system a modern plant was built at Lock 12 on the Coosa River. This was completed in 1914, and was the first development in Alabama to combine river improvement with power development. It has an operating head of seventy feet and a capacity of 110,000 horsepower from six units of 13,500 kw. each.

Twelve miles down the Coosa River an additional hydro-electric plant is being erected at Mitchell Dam, which is the first development to be made in Alabama under the Federal water power act. Twelve hundred men are busily at work building this dam and power house which will be ready for service in January, 1923, after a construction period of eighteen months. Mitchell dam has a length of 1,200 feet and when completed will contain approximately 200,000 cubic yards of concrete. There will be an operating head of seventy feet on the turbines and the four big units will develop a total of about 134,000 horsepower.

Supplementing this hydro-electric capacity is a modern reserve steam plant at Gorgas, on the Warrior River, with an installed capacity of 75,000 horsepower, and a second steam plant at Gadsden, on the Coosa River, of 15,000 horsepower capacity. The Gorgas plant is unique in that it has a coal mine in its back yard, the coal being mined, washed, crushed and delivered to the hoppers of the automatic stokers on the sixteen boilers with the minimum of labor. The steam from these boilers operates two turbo-generator units of 30,000 and 45,000 horsepower respectively.

The main transmission lines from these plants are operated at 110,000 volts and connect these generating stations with primary substations located at Birmingham, Bessemer, Sylacauga, Jackson Shoals, Anniston, Gadsden, Huntsville and Gorgas, making available blocks of power at 44,000 and 22,000 volts. These lines are largely in duplicate and in loops to insure reliability of service.

From these primary substations distribution lines operating under 44,000 and 22,000 volts supply towns and industries throughout the districts served. These transmission and distribution lines now have a total length of approximately 1,500 miles.

Thirty-five cities and towns are served directly by this system and twelve additional cities and towns through con-

tract. This service covers a wide variety of industries, but a point of especial interest to Cotton's readers is that the cotton mills on this system had total maximum demands during 1921 equal to 20.5 per cent of the entire system demand, while their consumption in kilowatt hours was 16.5 per cent of all deliveries to all customers.

That the South is gradually forging ahead in its manufacture of cotton through the aid of such developments is indicated by its increase in spindleage in the last twenty-six years of nearly 400 per cent; its increase in looms of over 200 per cent; and its increase in mills of nearly 150 per cent. From 36 per cent of the total cotton consumed by the mills of the whole country in 1897, the southern mills increased their consumption until it stood at 55 per cent in 1920, while during the month of June this year, according to Bureau of Census reports, they used 66.2 per cent of all the cotton consumed in the United States as compared with 33.8 per cent for all the other mills of the country. This was an increase in consumption over June, 1921, of 63,603 bales or 23 per cent.

The principal reason for this increase in the industrial development of the South is indicated in a simple editorial statement credited to *The Manchester Union* of Manchester, New Hampshire. In commenting upon the removal of the Stark Mill of that city to the South, the Manchester paper is quoted as saying:

"However, the removal of the Stark Mill activities from Manchester to one of the southern cotton manufacturing cities is not done for controversial effect. It is not a move in a labor dispute. It is a public and indisputable notice by the International Cotton Mills Company, owners of the Stark Mill, that they can manufacture the former products of the Stark Mill more cheaply, and more profitably in the South than in New Hampshire. Here is a blunt, uncompromising truth which it is imperative New England and New Hampshire acknowledge."

Undoubtedly the Manchester paper is correct in its statement and the main features that support this truth are a less severe climate, more tractable workers, a more favorable location in relation to the raw material that saves in transportation costs, large quantities of reliable power at reasonable rates, and fair and equitable labor legislation. The final outcome is inevitable.

With the Weavers' Division at Anderson

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The attendance broke the record. There was a whole notebook full of valuable and interesting discussion. The crowd was a congenial and happy one. Manifestly the entertainment could not have been surpassed. So, with all these things, the meeting held by the Weavers' Division of the Southern Textile Association at Anderson, S. C., on Friday, July 21, made for itself an indisputable place among the most successful and beneficial sectional meetings held thus far by the Association. The meetings were held at the Anderson College for Women, just out from the town, luncheon being served in the regular dining room of the college.

It must have been through some unheralded intuition that the mill men sensed the hospitality and cordiality that awaited them in Anderson, and so, more than two hundred strong, they came and were not disappointed. For those who were fortunate enough to be in Anderson on Thursday, a pleasant automobile ride to Bascobel Lake and a swim therein offered a refreshing diversion and formed a part of the entertainment provided by Anderson.

But, as enjoyable as was the entertainment, and as pleasing as is its memory, the impression must not be gained that the discussion on weaving was not of interest. It was, most assuredly, the most interesting weavers' meeting held yet, and the seriatim report which follows will show that a number of valuable and interesting points were developed.

The Morning Session.

The discussion at the morning session was devoted entirely to slashing. The meeting was opened with prayer by Dr. John E. White, president of Anderson College, and Mayor Fant then welcomed the delegates on behalf of the city. John W. Clark, president of the Southern Textile Association, responded briefly on behalf of the visitors. While speaking Mr. Clark read a letter from F. Gordon Cobb, general chairman of the Association's sectional committee work, who was unable to attend the meeting. The letter introduced L. T. Curry, who, Mr. Cobb stated, had brought to the meeting full equipment for demonstrating starch mixing and who was also in a position to render to any of the mill men interested reports on the tests conducted by him for the Association.

W. H. Gibson, Jr., of Union, S. C., the chairman of the Weavers' Division, then began the discussion. First, he distributed cards requesting certain information from the men regarding the life of shuttles, twine harness, reeds, picker sticks, etc., and asked that these be filled in by the mill men and returned to him as promptly as possible.

The first question presented for discussion was, "At what temperature is it best to boil size and how long should it boil?" The chairman called upon W. W. Greer, of Ware Shoals, S. C., for an opinion regarding this question.

"I think different starches and compounds should require different cooking," began Mr. Greer. "For our mill we use a thin boiling starch. We boil it in the kettle at 212 degrees for an hour and a half. We have recording thermometers and we boil the size by the clock.

"Then we try to keep it from 200 to 210 degrees in the size box. Some men say that is too hot, but we have tried different temperatures and I believe the size sets better on the yarn at that temperature, especially after you pass 20s. We run from 4½s to 30s warp yarns. Now on the 4½s it is not necessary to boil it so hard, but from 20s to 30s we boil it 210 degrees in the size box and keep it right around that. I don't believe you can keep it as hot in the size box as in the kettle, but if you do not fill the box too full you can keep it at 210.

"We made tests on breaking strength, boiling the size from one hour on up, and we got better results at an hour and a half on 22s yarn, at 210 degrees in the size box than at less."

Responding to Chairman Gibson's "Anyone else?," J. V. McCombs, Buffalo, S. C., made the following statement: "I attended the last weavers' meeting in Greenville, and I believe some one made the remark that he got a better breaking strength with 185 degrees in the size box. Now,

I have the Powers regulator and the Foxboro recorder, and I tested at 185 degrees and ran on up to 208, using a thin boiling starch, 40 viscosity, and I found that 208 gave me a better breaking strength than 185. We boil at 212, and it takes it about 15 minutes to come to a boil and we boil it an hour and thirty minutes longer. We run from 205 to 208 in the size box, and 212 degrees in the kettle, and I require the man to keep that boil on for an hour and 45 minutes." Replying to a further question from the chair, Mr. McCombs stated that the increase in breaking strength was about two per cent, on 18½s warp yarn.

J. L. Bobo discussed the question by saying that after some tests, he had found that cooking a thin boiling starch an hour and a half at 190 degrees in the vat gives him a better breaking strength than any other temperature he had tested. "I also find," he continued, "that adding weight to the finishing roll—making it 600 pounds instead of 500 pounds—gives a smoother finish on the yarn, and I would like to know if anybody has any information on that." Mr. Bobo makes 20s yarn.

At this point Mr. Curry asked how many tests the gentlemen who had spoken had made on each temperature. Mr. McCombs replied that he ran 185 degrees for two days on one slasher and tested it three or four times a day. He pointed out that at this temperature the yarn would mat up and shed off to a noticeable degree.

"How many have tried making the finishing roll heavier?," asked Mr. Gibson. "Mr. Bobo says it makes smoother yarn." About a half a dozen members indicated they had tried this. Response to Mr. Gibson's next inquiry indicated that the majority of the men were in favor of boiling size at a higher temperature. Then in this connection the chairman read from a statement of Gordon Cobb on this subject. Mr. Cobb's remarks were as follows:

"The boiling point of water is 212 degrees at sea level and less than this at points higher than sea level. It is possible to raise the temperature in an open kettle higher than 212 degrees because the starch added to the water makes a thicker solution which retains the heat and enables the temperature to be raised to practically the same temperature of the steam with which you are cooking. The information which we have does not state what is the best temperature to boil the size, therefore we can only tell you what the mills are doing from the reports which we have. We find that when the steam is well trapped before entering the kettle, the recording thermometers show a temperature of about 225 degrees with the steam valves wide open. We were surprised to notice that a kettle of cooked size which had the steam cut off at 5 o'clock in the afternoon, retained a heat of 200 degrees until 8 o'clock that night, and did not fall below 175 degrees during the night. We also found that by putting a few pounds of tallow in the size kettle, after the stirrers are stopped, will cause the size to keep well all night. The tallow forms a skim over the kettle of size and seems to keep it sweet and fresh. The tallow of course mixes with the size in the morning when the steam is turned on."

In reference to this latter suggestion of putting tallow in the size kettle, President Clark made the suggestion that the men try using a half a pound of salicylic acid in the size, which, he said, will keep it sweet almost indefinitely. He stated further that the use of this antiseptic will prevent mildew from forming in the size if stored for any length of time.

Chairman Gibson emphasized that this was an important point, as at present some mills throw away what size is left over on Saturday and make up a new batch on Monday, whereas by the adoption of this suggestion, it is possible to keep the size for an indefinite period of time.

Mr. Gibson then brought up the question, "At what temperature should the size be kept in the size vat at the slasher?," and read again from Mr. Cobb's report in reply to this question:

"We find quite a diversity of opinion and cannot give any definite answer. Some mills claim that they are getting more weight in the warp with the size vat kept at 180 degrees than they do when running with the size boiling hard in the vat. As a matter of fact, I have not been able to find the size in any mill's vat which was boiling. The highest temperature which we have been able to find was 200 degrees. I do not believe the size was boiling but was jumping caused by the jets of steam coming out of the pipes. It was impossible to get over 200 degrees as the size would be thrown out of the vat; therefore, we think it a mistake to say that the size boils in the size vat."

After reading this extract, Mr. Gibson pointed out that "We have some here who contradict this statement. That is just what we want. It seems that in the past years we believed we could not get a temperature more than 200 degrees. Mr. Greer says he gets more than 200. I have not personally been able to get above that without having it splash up on the yarn. How many have tried to get 200 degrees in the size vat? Hold up your hands. Only four. Any discussion on it? What do you think about it, Mr. Curry?"

Mr. Curry replied that he had been making some tests on it but was not ready to give out anything. "The tests I am making," he explained, "are from 170 to 207 degrees in the size vat. I find it pretty hard on the circulating system to keep it from jumping up on the yarn. It is most too strong. Where you do not run very much size in the vat you can get it up around 212 degrees, but where you keep the vat pretty full it is a hard matter to get it up over 208 without having it jump out."

Regarding this matter of the size jumping out W. B. Williams, Greenville, S. C., suggested a remedy by boring the holes in the steam pipe that enters the vat to different sizes. In other words, he explained, he found that the size nearest the first entrance of the steam in the vat was always a little higher than at the other end of the pipe, and by boring the holes larger as they left the valve, he gets a more steady movement of the size.

Mr. McCombs added that "Where the size pours in it will run from two to three degrees higher in temperature" and stated that in testing this he had found it 205 degrees at one end, at 203 at the other end, explaining that "we overcame this by boring the different size holes, as Mr. Williams explained."

Explanation of why the men who indicated they were running a high temperature—above 200 degrees—in the size vat was requested by Mr. Jolly.

The practicality of this method was explained by one of its advocates as follows: "I will just state that it is a necessity to run it over 200 degrees if you can—the higher the temperature the better the results you get. I know that from experience. The hotter it is the deeper in the yarn it goes."

In other words, the chairman supplemented, if the

yarn was put in cold water it would not penetrate at all, and the higher the temperature of the liquid the better it will penetrate the yarn.

Mr. Williams spoke again at this point. "In stating that I changed the size of the holes in the pipe," he explained, "I do not want to leave the impression that I am a 'high temperature' man. I keep it at a low temperature. I do not splash my size up on the yarn. I have a small amount of steam. I am in favor of a low temperature because I think it gives me a smoother yarn. I think it gives a harder yarn to keep too high a temperature in the size vat."

J. D. Beacham, of Honea Path, S. C., asked Mr. Williams to explain "why he gets the yarn harder by boiling it thinner than by boiling it thicker."

"Whenever I boil the size hard in the size vat it gives me a harder yarn," returned Mr. Williams. "I keep it boiling hard enough to penetrate the yarn and I do not have any shedding on the loom or on the slasher, and I get seven per cent added to my warps." Mr. Clark asked what kind of starch Mr. Williams uses, declaring that the difference in size makes a difference, and the reply was that "I use a medium thin boiling starch." "What fluidity?," asked the chairman. "I don't know," replied Mr. Williams.

T. N. Crocker, Goldville, S. C., asked if it would not make a difference if the size could be cooked with a closed coil, so that the steam would not accumulate in the size and weaken it by condensation. "I believe if someone would get up a size vat that would keep the steam out we would get a stronger size. For instance, we will take a size vat that will hold 35 gallons. About how much water will evaporate during the process of sizing? I imagine it will be something like five gallons, and if there were five gallons it would reduce the starch that much. I would like to find out just how to determine that."

President Clark explained that this could be done easily by a calorimeter test.

When the question was asked, "Has anyone ever used the closed coil in the slasher vat?," F. C. N. Jackson replied that a number of years ago in the Lancaster Mills at Clinton, Mass., he had three slashers used for dressing beam dyed warps on the warper beam, on the vats of which they had removed the open coil and put in a kind of extra bottom to the vats, where the steam entered without getting into the size directly. The only thing he found, he reported, was that the size seemed to get a little thicker; instead of the starch getting thinner it seemed to get a little heavier. He also found a tendency to bake or cook on the bottom of the size box, but otherwise it gave good results.

Getting back to the question of finishing rolls, Mr. Hamilton asked the specific question, "What is the best weight to use—400, 500 or 600 pounds, on 30s yarn?" The chairman replied that Mr. Bobo reported best results from a 600-pound roll. "640," corrected Mr. Bobo.

"He can have it," ejaculated Mr. Beacham. "Why?," was asked. Rising, Mr. Beacham gave the explanation for his statement. "I have found from experience that a lighter roll with less flannels gives better results than a heavier roll with more flannels," he said. He pointed out further that the heavier roll may squeeze the yarn too much and run all the size out; that with a lighter roll and shorter blanket, the cost of slashing is reduced and a more even yarn produced. He recommended a light roll and less blankets. He added, in reference to the speed that "I have never seen one run too fast yet."

Asked what weight of roll he would recommend, Mr. Beacham's reply was "From 390 to 400 pounds."

J. N. Badger, of Greenville, told of an experience he once had on heavy work, where they were not able to get enough size in the yarn, and the only way to do it was to use a heavier squeeze roll. Mr. Badger also pointed out that in the several meetings he had attended, a large majority of the discussions had been on print cloths and medium numbers, and stated that he and other fine goods men would like to have some discussions on the finer numbers.

E. M. Walters, of Charlotte, was the next speaker. He said, "We had a boss weaver at the Hoskins mill who cut the weight of the rolls down to 350 pounds, and the size he was putting on was coming off at the looms. So the present boss weaver wanted a heavier roll and I had one made that weighed 510 pounds and it is on there yet and the looms are cleaner than they ever were. It's no use putting the size on there and then knocking it off again. We find our looms are cleaner—our work is much better—with the heavier roll, this on 56s warp.

"At the No. 2 mill we have one slasher on 40s warp, and have a heavy roll there and I find it helps us there too. I think about a year ago Mr. Boyd had the figures of percentage of size we were putting in at a meeting. We put on about six per cent, and I do not think any more should be put on that number of yarn. You (addressing the chairman) have been at our mill and I think you found very little size shedding off."

E. A. Frank, of Laurens, S. C., was the next man to tell his experience. On 50s, 60s and 70s, he said, he uses a heavy roll, pointing out that with the heavier roll and good blankets on it, the yarn will be left round, in a better condition to weave than if it were flat. "I know a weave room that ran under the light conditions with not much blankets, and their weave room sweeps was about 475 pounds a week. Now, with the heavy roll they have reduced these sweeps to 175 pounds. The difference is going into the cloth."

For specific information, the chairman asked those using a roll weighing around 350 pounds to hold up their hands. No one responded. Eleven indicated they were using rolls weighing around 500 pounds; five said around 600 pounds; no one was using a roll weighing over 600 pounds, it developed.

It developed from a short discussion at this point, participated in by Messrs. Beacham, Bobo, Gibson and others, that it is the best practice to use the blanket on the back roll and run them for a while and then change it to the front roll.

Mr. Crocker asked for the weight of the squeeze roll on a Cohoes slasher, and the reply was "From 500 to 510 pounds."

After a question from the chairman for further information regarding fine yarns, a member stated that, according to his judgment, the twist in the yarn plays a very important part in the temperature to be used and the penetration of the yarn, and also that with fine yarns, the longer the staple the harder the yarn will be, which also would affect the sizing. He asked for "information regarding the best way to get the size to penetrate fine yarns."

As a reply to this question, Mr. Frank, of Laurens,

gave the following statement: "We are on 50s, 60s and 70s, and cook the size 2½ hours in the first kettle, then we have a storage kettle and transfer it into this storage kettle, and when we put our size in the vat we keep it boiling. I have a heavy roll and use about nine yards of blanket—that puts the yarn in a round condition—and we run our slashers as slow as we can run them. We take about three minutes to a 60-yard cut. That gives the yarn more time in the size vat and the harder you can boil it and the longer you keep it in the vat, the more it will penetrate. We have Cohoes slashers and we run them as slow as possible—2½ to 3 minutes a cut. We do not have very much shedding and we have run as high as 144s. If we cook the size any less than that it would knock off and if we run the slashers faster there will be more shedding. It is not the stuff you get on the yarn; it's the stuff that gets into it." Mr. Frank was asked for his size formula, and gave it as follows: "We use 80 gallons of water, 12 pounds of compound, 12 pounds of tallow, 90 pounds of potato starch."

At this point President Clark brought out that the difference of viscosity in potato starch and corn starch is that the longer potato starch is boiled the thinner it gets; while the opposite is true with corn starch. Inquiry from the chair developed the fact that two men present were using potato starch while the remainder of the men were using corn starch.

The next experience was from J. H. Laurens, of Laurens. "I am on 30s, but up to about a year ago I had fine numbers, and my experience is about the same as Mr. Frank's. As far as the heavy roll is concerned, I do not think this is so important; I believe the most important thing is the cushion on the roll—that applies to all numbers of yarn. On 50s, a 350-pound roll with a good cushion gives good results. And on 30s, using a 500-pound roll with good cushion, I am getting just as good results."

At this point the chairman presented the following question for discussion: "How many pounds on the steam cylinder is best for good running work?," and read the following opinion on this subject from the report based on the weaving questionnaires:

"This question means that you must state the speed of your slasher or the inches per minute passing through the slasher, and the number of ends in the set and the size of the yarn. We can give you information from mills we have asked to keep this record, and the results are from records kept on 9 or 10 slashers, all on 30s warp yarn, this yarn going into sheetings and print cloths. The slashers were putting through 75 to 85 yards per minute while running warps of 3,100 ends. The steam on fair days ranged from 5 to 6 pounds and on cloudy days from 7 to 10 pounds. Another record shows 2,600 ends using an average of 7 pounds of steam in fair weather and 10 pounds in cloudy weather. These reports give you the two variations which represent the highest and lowest steam pressure. On the slashers running 3,100 ends they claim that they can get along very nicely with three or four pounds of steam while running warps of 2,200 to 2,400 ends."

"All that run from 3 to 5 pounds hold up your hands," prompted the chairman to start the discussion on this, and 13 men replied in the affirmative. There were 20 using 6 to 10 pounds. No one was running 15 pounds, it developed, and the chairman stated that that used to be an old custom.

Mr. McCombs stated that he runs from 8 to 9 pounds up until about 9 o'clock and then cuts it down to six; on coarse yarns. Mr. Bobo reported that he gets the best results by getting the steam up before starting. He runs from 4 to 5 pounds, starts with that and stops with it.

"I think by starting up in the morning at about 6 pounds and running about a beam and then reducing to 4 pounds and holding it there the balance of the day will give the best results. It takes me about one minute and 50 seconds to run a cut of 60 yards, 2,400 ends." This statement was from Mr. Hoy, of Spartanburg.

Mr. Crocker said "I am running 10 pounds on 30s yarn, 2,000 ends. The reason is, it seems our steam is very much saturated. We are located about 250 feet from the boiler with a pipe running under the mill, and of course it is reduced somewhat. When we start up I run 10 pounds up to about 1 o'clock and then reduce it about a pound. We do not have any return system but we simply trap it out." Some time ago, said Mr. Crocker, he found about 147 warps on hand and his president was very much interested in them and wanted him to stop the warps off. The reason given was that some years ago the mill had quite a number of warps to mildew, and on questioning Mr. Crocker found that his predecessor had run about 5 to 6 pounds on the slasher cylinder. "We run a cut in about 1½ minutes," he said, "and I am inclined to believe that the faster the cylinder is run, the more steam it should use. The longer you keep it on there the more it will cook. I am an old carder and have always believed that the quicker you get the cotton through the card the stronger it will be, and I think the same thing about the slasher. In order to do it we carry about 10 pounds pressure."

In this connection, President Clark gave the results of some tests made by him which showed the difference in temperature with steam at 5 pounds and 10 pounds pressure to be about 4 degrees.

Mr. Campbell, of Cherokee Falls, said he runs 5 pounds pressure. "I run a low pressure," added Mr. Veal, "and do not have any mildew. I get good results by running a damp yarn and low pressure and fast speed. I think a good many of us burn our yarn on the cylinders, by running too high a pressure, and if the slashers are too slow, we bake the yarn." He asked what sense is there in drying all the moisture out of the warps and then attempting to put it back in again later by himidification?

"I would like to ask if anybody has made any tests as to how much moisture he is putting in the yarn in the slashing process," asked Mr. Laurens. Continuing, he reported, "I have some tests along that line and I find that it has from 1½ to 2 per cent more weight afterwards than before."

The next question was, "What is the difference between 20 fluidity and 30 fluidity starch?," and the chairman asked if some sizing compound man would explain it. There being no response from any of these men, L. L. Brown, Clifton, S. C., replied, "I am not a salesman but I can tell you what a starch man told me about it, but I won't swear it is right. The matter of fluidity is something that all the concerns do not have the same standard on, but two of them that have the same standard take a pipette and have a hole in it through which 100 drops of water

will pass in a minute's time. Then they run starch through there and if it drops 20 drops a minute it is 20 fluidity. If it drops 40 drops a minute it is 40 fluidity."

"Some one was talking about keeping the yarn on the cylinders too long," said W. P. Leister, "I would like to know what the experience has been in testing yarn before and after slashing for breaking strength."

"I made some tests on that," responded Mr. Curry, "and I found that we did not get the same thing every time. I do not believe in jumping at conclusions too quickly, and made ten or twelve tests, and it averaged about 15 per cent better in breaking strength." Mr. Frank reported that he had found a gain of about 7 per cent in breaking strength and 15 per cent in weight. In this connection he pointed out that it is impossible to get the correct result in testing by taking two bobbins and making the test with them, declaring that the best way is to mark the ends and get the same two ends and run them under the same tension.

Mr. Beacham said that on 30s, the weight increased 7½ per cent; the breaking strength went up from 14 to 15½ per cent; with 85 pounds corn starch to 180 gallons of water.

Chairman Gibson next read a letter from a member not present, requesting discussion on the uniformity of lengths of cuts coming from the loom. "The tension of the warp would have something to do with it," said Mr. Hoy. Mr. Williams was of the opinion that the cam trip had a good deal to do with it, as the vibration in the floor might catch it in such a position that it will not fall in the same place all the time. "Now if we had a positive cut marker then we would get more even lengths," he said.

Everyone speaking on this question agreed that there is considerable variation in the lengths of cuts at the present time, but no general remedy was suggested. Mr. W. W. Cobb mentioned that the tension on the warp would have a great deal to do with the length of cuts, as well as the tension on the brusher in the cloth room. J. V. McCombs and W. A. Black, of Spartanburg, both indicated they were getting variations, Mr. Black saying he had given up all efforts to get an absolutely uniform cut, declaring it an impracticality, inasmuch as there are so many things that enter into it. Mr. Bagwell said he had found that the variation differs with different styles of goods. On three-yard sheetings, for example, the variation did not appear so much as on 2.85 drills.

"I want to mention in regard to length of cuts that a lot of this variation is made on the slasher," said Mr. Teal, of Westminster. "In running a beam it is impossible to run the same tension all the time, and that will take some of the life out of it. It will also stretch it, and maybe the next beam will be run with a different tension and that will make some difference." Mr. Teal's statement closed the discussion at the morning session.

The Luncheon.

A delightful event of the meeting was the luncheon which was held in the dining room of the college at 1 o'clock. Judge H. H. Watkins, of Anderson, acted as toastmaster, and at the speakers' table were a number of prominent cotton mill executives who were special guests for the occasion. These included Robert E. Ligon, vice-president and manager of the Equinox and Gluck Mills, Anderson; J. P. Gossett, president of the Brogon Mills, Anderson; James D. Hammett, president of the Cotton Manufacturers' Association of South Carolina, and president of the Orr Cotton Mills and Chiquola Manufacturing Co.; George E. Spofford, vice-president and general manager, Anderson Cotton Mills; Dr. John E. White, president of Anderson College; John W. Clark, president of the Southern Textile Association; David Clark, of Charlotte; and A. B. Carter, secretary of the Association.

Dr. White, Mr. Hammett and Mr. Ligon made brief and interesting talks. Music was furnished by a pleasing orchestra, and the meal was excellent.

The Afternoon Session.

The first discussion at the afternoon session, which was brought to order at 2:15 o'clock, was in regard to the relative merits of steel and twine harness for plain work. In response to a question from the chairman, only four members indicated they were using steel or wire harness for this purpose. One of these men, W. W. Veal, said, "We have not been running steel heddles very long, but we do get better results. The humidity seems to play havoc with the twine harness and they ran out so fast that we went on the other harness as a matter of economy. Although the first cost is greater, since we have been using the steel harness we find that we get a better production, and of course the life of the harness is obliged to be considerably longer. We are very greatly pleased with them so far."

Mr. Black, of Spartanburg, said that they had tried out using the steel harness instead of the cotton twine in order to economize, but "we found that on 68x72 that it did not work." However, "on coarse work where we are making several different styles and changing often we find that for convenience it is the best plan to use the wire harness."

"Would you consider steel harness adaptable for work as high as 48 sley?," was asked by Mr. McCombs. He continued by saying they had found that they used up a twine harness every three or four months, and changed to the steel harness—on osnaburgs—and the weaver likes them very much better; it runs better, he said. He said he would not advise going above 48 sley goods, however, with the steel harness.

J. N. Alexander asked if "on coarse numbers, can you put as good a finish on the cloth as with the twine harness? I once ran some weaving with steel harness, on export goods, and I found it hard to keep out the reedy look on the goods."

"We are having no trouble," replied Mr. Black. "We make not only exports but crashes, osnaburgs and other goods, and if it were not for our steel harness we could not have made the changes. We have no trouble. We are using the old steel, what is called the German heddle."

Cloth Tolerance.

At this point Chairman Gibson turned the trend of the discussion onto the topic of "cloth tolerance." He explained that at a previous meeting several mills had agreed to reinspect cloth which had been passed as "firsts" and keep a record of the defects found therein, in that way getting at the approximate number of imperfections which are getting by in southern goods which are classified as "firsts." The idea being, he explained, to secure sufficient information on this question to enable the Association to establish a standard for imperfections that might be permissible in first-quality goods. In other words, it is expected to determine the number of all kinds of defects that

are being accepted in first-class goods by buyers, and then possibly take the smallest number of each defect found and set that as a standard by which all mills should inspect their cloth.

Mr. Gibson referred to the recommendations made by William H. Harriss, who addressed the Southern Textile Association at the Charlotte meeting in September, 1921, and who, upon his return to New York, prepared a "standard" for a "good delivery" of cloth, utilizing the information gained at the Charlotte meeting. Mr. Gibson further stated that he had disagreed with Mr. Harriss' suggestions in part, especially with reference to the variation to be allowed in width, declaring that he felt Mr. Harriss was not giving the mills sufficient leeway on this point. After his preliminary remarks, the chairman called on Mr. Moseley, cloth room overseer at Ware Shoals, S. C., to give his opinion on this point.

"It is a very rare thing that you will find a piece of cloth that will run the length of a cut all the same width," Mr. Moseley responded. "It is caused largely by the conditions in the weave room, I think, and I do not pay any attention to a variation of ¼ of an inch in making my selections."

D. A. Jolly, of Lanett, Ala., expressed it as his opinion that the customer does not complain on cloth being too broad nearly so much as he does about it being too narrow. This opinion was concurred in by the chairman, who said he found the buyers would not ever complain on over-width, but would raise a kick on under-width every time.

Mr. Leister said he had a complaint recently on a piece of cloth that was ⅜ of an inch off. The customer turned it down saying it was too light. "He figured off the ⅜ of an inch and did not give us credit for the 36 inches that were in there and said we were trying to put something over on him by giving him under weight."

Mr. Alexander related an experience when he was loom-fixer. They had considerable trouble with the regularity of the goods, he said, and the section man had to go over the goods four to six times a day with a measuring stick. He said the location of the trouble was in the variation of power received as the rest of the mill would be shut down and started, and pointed out that with properly controlled power now-a-days that condition does not exist.

"We all admit there is considerable variation in the width of cloth," said Mr. Beacham. "Mr. Alexander has attributed this to the variation in the speed of the loom. I will admit that years ago we had more variation in the width of the goods than at the present time, but I believe we do not have enough humidity. To my best knowledge, the thing that has done more to relieve the situation than anything else is relative humidity. There is another point in it and that is the steel heddle. The width of cloth varies quicker under humid conditions than it will with the twine harness.

"I would like to know of any method that will control the width of cloth other than the humidity and the let-off. I want to know how many men think that if we had uniform humidity and the Roper let-off, would it not be possible for us to have uniform cloth?"

Mr. Crocker said he heard an old farmer express the proposition by a striking illustration. Talk about this question came up, he said, and the farmer explained it by telling that at the cotton gin they used to spray water on the cotton to make a tight bale, and that the same principle applied on the loom.

"It looks to me like that inasmuch as we have the automatic loom and the builders have built it so good for us that it is up to us to see if we cannot eliminate as much irregularity as we can," added Mr. Crocker.

At this point, Chairman Gibson read the recommendations offered by Mr. Harriss for standard cloth tolerance, as follows: Width, two per cent more and one per cent less; filling, four per cent either way; warp, two per cent more and one per cent less; weight, one-half of one per cent lighter to two per cent heavier.

Mr. Gibson urged the adoption of a standard method of determining the weight of cloth. "Some mills figure the count times the width of the cloth, while others figure the same way plus the selvage, so I think what we should do is get the same method for everyone. If some mill is adding 25 to 30 threads for the selvage, and you are taking enough ends out of the body of the cloth to make the selvage you are going to be shy. How many add the selvage, that is, figure the width times the count and add the selvage?" Sixteen indicated that they were doing so.

Mr. W. W. Cobb said in his opinion it depended on the honesty of the mill. Mr. Leister's opinion was that "the only way to do is to add the selvage." "If a piece of goods sold for 4,400 threads it matters not how it is put in," said Mr. Alexander. "The question would be to figure the spread of the reed and make it the right width. Of course you would be 24 threads shy unless you took the spread of the reed."

"I have in mind a couple of mills," commented Mr. Crocker, "running on print cloths. One is putting in 2,810 ends and the other is putting in 2,778 ends. Both are getting the same price for the goods from practically the same people, and neither has had any complaint. The one mill is able to make a little heavier warp and a little heavier filling, and they get by with it. One of the mills is using 32½ reed and the other is using 33 reed. It costs one of the mills considerably more money to produce cloth that passes as the same as the other."

"If you use the same constant in figuring the reed would it not be the same thing?," asked Clifford Barnes, of Atlanta. "The difference between those fellows is that they figure the constants differently."

"We discuss these things," said W. W. Cobb, "but we never seem to get anywhere. I should like to see us take some action on this."

Mr. Alexander objected. "I think this is too large a question for us to fix here," he said. "I couldn't and wouldn't do anything without talking it over with our mill heads, and I think most of the rest here are in the same way."

"I rise to endorse what Mr. Alexander has said," was Mr. Black's remark. "I doubt if there is a man in the house who has anything to do with the selling of the goods. We are the manufacturers.

"It has been a long-established rule," he continued, "that an honest fabric is the width of the goods multiplied by the pick plus the selvage, and I am opposed to our going on record as robbing the fabric of its selvage. It is our place to furnish the selvage. I believe that cotton manufacturing in the South is just in its infancy, and I would like to see the young men coming up make honest fabrics. We want to look the buyer in the face and say, 'Yes, there are as many threads in that piece of cloth as

you paid for.' We want to put the proper number of ends in our fabric and make our goods second to none."

Mr. Crocker indicated he is figuring the number of ends plus the selvage. Mr. McCombs explained that on 48-pick goods, to take 24 threads out would mean the loss of a half inch in the width, and that he would have to spread the reeds out in order to bring that back. M. B. Lancaster, Pacolet, S. C., gave it as his opinion that it would be an unwise thing to change the construction of a piece of cloth after the trade had become accustomed to it.

L. L. Brown told of a visit to a Fall River mill making the same grade of goods as that he manufactures at Clifton. He said that on a 64x60, 27-inch piece of goods the New England mill was using 28½s warp and 37s filling, and that the superintendent told him he lets the selvage take care of itself, while at Clifton, Mr. Brown said he uses 29½s warp and 39s filling for the same goods.

J. P. Gossett, president of the Brogon Mills, at Anderson, who was a visitor at the afternoon session, made a brief talk in connection with this discussion. He said his suggestion would be that the weavers and superintendents take the matter up with their executives. He pointed out that the mills that are putting in 24 to 36 threads for selvage are running finer numbers by 1 to 1½ numbers, and that "it is a waste of the company's money to be spinning finer yarns than are necessary." He also pointed out that if a mill is putting in the extra selvage they must widen the spread of the reed.

By majority vote it was decided to take no definite action on this matter, but to refer the question to a committee to be appointed by the Chairman of the Weavers' Division. This committee as appointed consists of H. W. Moseley, Ware Shoals, S. C., chairman; H. H. Boyd, of Charlotte, and J. N. Alexander, of Newry, S. C., who will investigate the advisability of the change and report back to the Association.

The meeting adjourned shortly before four o'clock, following this latter discussion, and a large number of the visitors remained in Anderson the remainder of the afternoon and attended a baseball game as the guests of the Anderson County Textile Superintendents' Association. This organization, by the way, was responsible for the delightful entertainment accorded the visitors

Vocational Education in Cotton Mills

BY M. W. HEISS.

For years the best brains of the country have been utilized in increasing the efficiency of mill machinery, and now the question arises, "Are we placing 100 per cent efficient machinery in the mills and employing operatives to run it that are only 30 per cent efficient?" Some may disagree with me as to the percentage of efficiency of the employees, but after having some experience in different mills, and from opinions of others, the writer does not believe that the average of even the best mills will run over 35 per cent. Therefore, when this industrial weakness was recognized by the federal government a few years ago in the passage of the Smith-Hughes Act, a fund was formed whereby the industries and the government went fifty-fifty on the expense for overcoming this deficiency, and the employees be given a vocational education at no expense to them.

When presented with this plan, each mill owner naturally goes through his own form of reasoning before adopting a new policy; therefore, we could expect him to attempt to analyze the situation thoroughly before permitting such a movement to penetrate his mill. Undoubtedly every mill owner can be convinced that an employee that understands his machine and who has developed his mentality so that he can reason, is more competent and more valuable to the mill than an employee who only knows how to run his machine.

It has been advanced as a counter argument that after an employee has been trained at the expense of the mill, he will leave to accept more money with some other mill. However, an analysis of even this situation will show a favorable side. Suppose a mill, through a night school, trained a man and made an efficient worker out of an unskilled employee and this employee was offered a higher salary somewhere else; the mill loses a good man that has possibly cost them a few dollars, but they have gained by it, for this man's success would have set a precedent that a number of other employees would attempt to follow by becoming more efficient through a greater understanding of their work. If this form of training is systematic and is not given up at the first discouragement, undoubtedly the efficiency of the entire organization would be raised.

Having thus far presented the subject entirely from an idealistic standpoint, the next question will be the presentation of some of the actual problems that arise in the developing of a proper system of vocational education in connection with a cotton mill.

The first proposition to confront a mill is to find some competent man in its employment to take charge of the night schools. This man should not only know the inside of the mill but should have enough education and personality to be able to make the night school interesting as well as instructive. It is not necessary to employ a man for night school purposes, for practically every mill has such a man that would not only be willing to take on this extra work for the additional remuneration, but for the interest in the people and the experience and education it would be to him.

After the head of the night school is appointed, the question of creating interest among the employees-presents itself, and interest at the start is not only essential, it is fundamental to the success of the work. After sufficient intrest is created, if conditions warrant it, other teachers may be selected, and the employees desiring to enter this night school divided in two groups, according to their previous schooling and to their work in the mill. No greater mistake can be made than by having a class composed of men varying greatly in their past education and from different departments, unless all are desirous of learning the workings of a certain department. The best system is to have a class or classes that are to bring the employees to such a point in mill arithmetic that they are then ready to study machinery and the necessary calculations. Other classes composed of men who have had sufficient foundation work should be organized for each department

in the mill; if conditions warrant this. In this way the teacher could be chosen according to his knowledge of individual work, and the employee could study that which he desires without loss of time in sitting in a class where something that he already knows or that he isn't interested in is being taught.

In getting established, an application blank with all data relative to experience and desires of employees should be filled out and filed by the teacher. This would supply a basis of information for organizing the classes and also for future reference. In organizing the classes, it is of paramount importance that no class should be so large as to make it impossible for the instructor to get in personal touch with each student, and keep each student at work during the class periods, which should never be over two hours in length.

The instructors should outline their work in a logical way, making their course simple and thorough. This, of course, would require some extra work. The departmental classes is where the merits of the instructor will show in the mill, for his task would be to teach the machinery in detail; explaining the whys and wherefores of each part and each operation; and not being satisfied that the student should know that such and such a thing happens, but why it happens. He should explain the causes of waste, what effects a little waste a day if kept up for any length of time would mean, the results of petty carelessness, belt slippage, settings and the reason for settings, efficiency of machinery and the other essential factors in each department. His duties naturally require a knowledge of the mill. In all classes loyalty to the mill should be encouraged and systematically developed.

The greatest problem is attendance. With poor attendance little work can be accomplished. The method of presenting the work naturally has a great deal to do with the interest the students take, and of course, attendance will be greatly dependent upon interest. It is a good idea to organize the entire night school, and then make each class into an organization, allowing the men to select their own officers. Then put the roll in the hands of the secretary and let him keep records of attendance, etc. He in turn can report to the secretary of the entire school and have the attendance taken up at regular meetings of the school. In some cases it will be found that the men themselves will impose penalties for tardiness and inexcusable absences. A supper or banquet every once in a while will also retain their interest, and short encouraging talks by some of the officials will be a great incentive.

As to the number of employees that the night school will touch, I venture to say that indirectly it will affect all, for if a keener interest is taken in the mill by the night school men, other employees will unconsciously be led to better work to a limited extent, but best of all, if the night school is developed into a successful organization, a good percentage of the employees will desire to attend. Some would never attend and that condition should not be cause for discouragement for it is always the case in everything.

Vocational night schools have been in existence long enough to give some direct information relative to their effect inside the mill. In one mill in the past year, two promotions have been made due entirely to night school work by parties promoted. In this same mill a personal record of production has been kept for each man in certain classes, and invariably an increase has been shown, also the general condition of the machinery operated by these men is better. In one case a student increased his production about 33⅓ per cent in six months' time without speeding up his machine, except by eliminating excessive belt slippage. It is safe to say that in this particular mill there is not a night school man who has not exhibited better workmanship and more interest in the mill than before going to night school. These benefits might be termed as visible advantages, but, as stated before, more interest as a whole is being taken. Night school men can be seen talking with their neighbors about problems that they are working and their superiors are constantly assisting, and, it might be added, also learning through the explanations that are necessary.

Some benefits can be seen at once, but like everything worth while, the real value comes slowly but effectively. Just so are the advantages of training employees. Dollars can not be plucked the first year, but with a well organized night school a mill can, in a period of years, expect to reap advantages therefrom, for it will be inevitable.

If this employee training meant a great outlay of money, it would still be a good investment that would eventually pay higher than a regular rate of interest, but on the contrary, the output of money by the mill is very little, for the state and federal governments furnish three-fourths of the teachers' salaries, leaving only one-fourth to be paid by the mills. This with a few incidentals is all the mill furnishes.

Competition and other factors are bringing all industries to the point where the word "efficiency" means more to them than an utterance of an idealist or a college professor. It means life to an industry, and it is so far-reaching that it touches every element in a mill including the rank and file of employees, and there is perhaps no better way of increasing employee ability than by training their minds through inexpensive vocational night schools.

Commemorating the fiftieth anniversary of the establishment of their organization, the American Dock Company, with offices at 17 State Street, New York City, have issued an interesting and attractive booklet entitled "A Half Century of Service," in which is given a brief history of the achievements accomplished in warehousing during the period from 1872 to 1922. The history tells interestingly of the growth and development of the storage business conducted by this company, illustrating the changes and expansion in buildings and facilities that have come as a result of the steady growth of this business, as well as the improvements in equipment which have become necessary. Other information and a number of well arranged illustrations tell the story of the company still further. Views are shown of the company's docks and warehouses, located on Staten Island, and the photographs show both exterior and interior scenes in and around these facilities. It is interesting to note that during the last 30 years the active management of the business has been under the direct supervision of one or more of the Pouch family, A. B. Pouch being the incumbent president; F. H. Pouch holding the office from 1900 to 1913; and A. J. Pouch being the executive officer from 1891 to 1900. The booklet contains 24 pages, and is a credit to the company of whose history and accomplishments it tells.

After Three Years

BY LUTHER H. HODGES*

The Story of a Successful Program for Trade and Industrial Education in a North Carolina Community

In conjunction with the State Department of Vocational Education of North Carolina and a corps of local night school teachers the writer recently prepared a complete report on the educational system which is being worked out in a typical North Carolina community. This report gives the number of classes taught, the attendance percentage and the subjects studied. An attempt is made in the report to outline a standard course for employees who want reading, writing and arithmetic, and those who want to take a complete textile course. Although a great deal has been accomplished in this particular community it is only a scratch on the surface in comparison to the things we must do to hold our own with other industries.

The writer has not attempted to do more than call attention to this very vital problem that affects the southern textile industry. While well aware that other sections besides the South needs to solve these problems, he is also aware of the fact that some plants are making rapid progress, but not even interest, certainly not activity, on the part of the great majority is yet evident. Much could be written in this connection about the plans that are being tried in some plants, and the methods which are being experimented with but it is not necessary to relate these.

There is a distinct need for some system of vocational education for the textile employees of the South. In practically all of the major industries there has been introduced some system for training workers along the lines they wanted to follow but we have done very little in the textile industry as a whole. We simply hire by chance and put a man on any job that happens to be open at that time and trust to luck that the man will learn the job before long and that he will stick. We have not yet learned how to fire or place, transfer or encourage, and many textile plants do not yet know what labor turnover means; certainly not how it is figured and do not attempt to combat the problem that is sapping the vitality of southern textile mills.

But this article has to do more particularly with the educational training among the employees of the textile mills. Some mills of the South do nothing at all along educational lines but there is a fairly general practice of conducting a night school class here and there under the Smith-Hughes Act. This act provides that the Federal and State governments cooperate with the local industries in bearing the expense of teaching the night classes, and putting on other educational programs. The work now being done by the State Departments is progressing and is pretty generally accepted as worthwhile but the various State Departments of Education and the local industries have a great deal of work before them to institute a real system of education for their employees.

Wherever a mill is large enough it ought to put a wide-awake man in charge of its educational work and have him devote some time and real study to the problems. It would not take all of his time and would certainly be a paying investment. There are several types of training which can and must be done before the program can be completely successful. The major part of the program will have to do with the night classes along the lines the employees are pursuing or are best fitted for. These classes would naturally take the form of courses in carding and spinning, mill arithmetic and calculations, weaving and designing, cloth analysis and warp preparation, and the like. There should be conducted also some courses in business training and industrial economics which would serve to broaden the knowledge of the foremen and make them interested in the larger phases of their industry. This would achieve two points; it would improve foremanship and would enlist the cooperation of the foremen and others in putting across educational work among the employees. There are, of course, many variations of these two types of training and there are many other lines one could pursue but these are the main ones.

To have an educational program succeed, a system must be worked out which will take care of the employee who is an adult illiterate yet who wishes to study until he can successfully complete a technical course in textile manufacturing. These technical courses can be completed either in night school work or through correspondence courses. It so often happens that classes which are put on in an industrial community are arbitrarily worked out and the needs of the employees are not definitely studied or considered. In such cases, an announcement is made that a class is to be taught and several of the employees join, only to become dissatisfied or disheartened in a few nights and drop out. The reason for their dropping out may be because the class did not meet their needs, or they were prepared for the instruction which was being given; or the teacher did not have the ability to put across the lesson. Of course there are other contributing factors toward the failure of such classes but these are the main ones. The first problem is to study your needs and then plan to meet the needs in the very best way.

We began our vocational education program three years ago and have just completed our sixth session.

We have conducted eighty-one night school classes since we first organized our work in October, 1919. These classes show the following interesting facts:

Total night classes organized	81
Total number enrolled	810
Average students per class	10
Average attendance for each class	6½ or 65%
Total number regular students	527
Average number night schools ran	15
Total nights attended by regular students	7905

Of these classes just a little over one-half or, to be exact, 41 have been the strictly technical classes, divided as follows:

Weaving and designing	6 classes
Jacquard designing and cloth analysis	8 "
Wool carding	2 "
Carding and spinning	11 "
Picking and carding	2 "

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Wool manufacturing	1	"
Elementary electricity	3	"
Mechanical engineering	1	"
Weaving calculations	5	"
Bleaching and dyeing	2	"
General mill calculations	3	"
Total classes (technical)	41	

The 40 classes have been the mill arithmetic classes which have studied the fundamentals of arithmetic and have used problems that applied to the mill operations. These classes have been well attended and have created great interest, and incidentally have been good "feeders" to our more technical classes.

When we began our vocational night school program in 1919 we organized 16 different classes for night study and enlisted as teachers the very best men we could find. These teachers included managers, superintendents, foremen and textile school graduates. We made a very creditable start but it was found out very soon that the students were not sticking to the classes. They were interested all right but they just could not master the problems in the technical courses that required the most fundamental mathematics. We had an array of courses such as wool manufacturing, carding and spinning, mill calculations and the like *but our pupils were not prepared.* We were trying to give them graduate work before they had mastered the fundamentals so necessary to their success in the technical courses.

We talked the matter over with the teachers who were somewhat worried over the situation and their unanimous opinion was that we should organize for these very same pupils, and for others who wished to join, some classes in arithmetic. All of the pupils did not need these fundamentals but we believe the most of them did. And in the Spring of 1920 we organized the arithmetic classes in the several sections of the town as suggested, and the classes had a very popular appeal for the students realized their need for this work. In the Spring reorganization we included some technical classes but the predominant note was the mill arithmetic.

From the Spring of 1920 we have been mixing the two types of classes, bearing as much emphasis as possible upon the strictly technical courses, but we have always been careful to start the new students in arithmetic. It has been a system of starting the beginners in the arithmetic classes and graduating them for the more advanced work. It has also been a process of selection and adaptation to a very great extent and in numerous cases we have picked our scholars for the technical course and have promoted them from the arithmetic classes to the advanced classes whenever they showed the ability.

We have been able to keep a close tab on our students by having regular reports from the teachers each month and by keeping an educational file which contains the list of all students with the names of their teachers and their grades on every course they took. The file also shows the number of nights attended and the mill in which the man works, with the position he holds. We have since added the age of the student so that we could better keep up with his progress and know what he was most interested in studying.

From time to time in the past three years we have gotten constructive criticisms and suggestions from students and teachers regarding our work and of late we have been getting a great number of ideas from the students which shows their real interest in the classes. We are trying to organize our classes to fit the needs and requirements of the students in the various communities. We once sent a teacher four miles to teach a group of students because most of the electrical students were in that locality. We now find ourselves planning and ready to organize classes along the same lines we tried to pursue in the fall of 1919, just three years ago. In other words, we are just now getting our night school work established and should be able to do some permanent work from now on. We want to make our classes more vital and more practical and we feel that this can be done with an interested group of students and a well organized corps of teachers. We have tried to get the very best teachers for every one of the classes and in practically every class the teacher has had a sincere interest in his work. We have always tried to put the spirit of service in our educational work, as we believe that is the only lasting basis upon which we can build a successful program.

We have been extremely fortunate in getting good teachers but have not been able to get enough practical mill men to do teaching. The practical men have not enough teaching ability and the real honest-to-goodness teachers are not practical enough in many instances, but we have several good teachers who know the mill through and through and they have rendered very valuable service. We try to improve our situation by regular teachers' meetings and conferences, and we very often talk to individual teachers about instruction methods and offer suggestions regarding certain principles of teaching. However, we have not done all that we might do in analyzing the teacher's job or in instructor training. Along this line there yet remains much to be done! But we feel that we are on the right track now and we look forward to greater interest on the part of the students and better teaching on the part of the teacher. It remains everlastingly true that the greatest secret of a successful class is the teacher.

In order to make our educational program a real institution we must establish it on a firm basis, and to do that we must needs show the student whom we want for our night school classes, what he can get and how and when he can get it. At a recent meeting of our teachers we propounded the following question:

"How long would it take a man under our present night school system to prepare himself to take a course in textiles if the man knew nothing at all about reading, writing or arithmetic?"

It was explained that the point to be reached was the place where a man could successfully begin a course in carding and spinning, weaving and designing or a complete textile course. We had present that night our adult illiterate teachers as well as the vocational teachers. They decided that we could prepare an average adult illiterate for the first I. C. S. or other correspondence arithmetic book in 25 nights of 2 hours each. It was then agreed that 60 nights would be necessary for the completion of the six I. C. S. Arithmetic texts which include 1. Elementary. 2. Fractions. 3. Decimals. 4. Weights and measures. 5. Ratio and Proportion. 6. Powers and Roots. The next books in this preliminary preparation were 1. Mechanical Calculations. 2. Yarn Calculations. 3. Draft

Calculations. It was agreed that the man should spend 20 nights on these three very important books before he was qualified to go ahead with a general course. Now to refresh your memory we tabulate the following:

For the grounding in reading, writing and arithmetic .....25 nights
For the completion of 6 I. C. S. arithmetic texts .....60 nights
For the completion of 3 calculations texts..20 nights

Total nights of attendance .....105 nights

This means 210 hours of class room work for this type of student. It is estimated the student would put in 100 hours of study outside the class room.

We are trying to establish our course so that the boy or man who has never been to school at all can begin at the very bottom and work up. However, we tried to work out the number of nights which would be required for the preparatory work of the man who has some education. The teachers agreed that the average fellow who can read and write pretty well and can figure a little can complete this preparatory work mentioned in about 60 nights, as against the 105 of the illiterate. This 60-night period was divided by allowing 40 nights for the six arithmetic texts and 20 nights for the calculations texts. It was agreed that the classes should last two hours a night and it was estimated that an interested student would spend in study about 2½ hours each week outside the class room. It was suggested that the session last 15 nights. This would mean 4 sessions of 15 nights each for the students who are able to read and write. This means two years of sticking to the job and presupposes regular attendance. The question might be raised, "Will a man stick for two or three years until he completes his course?" We offer the following statement made at our commencement exercises this Spring by one of our students. He said, "I have been attending night school for three years (6 sessions) and have missed only four nights since I started." This student has nearly completed a correspondence course in textile work. Our system prepares a man to handle his job better and furnishes the preparation and the incentive for him to take up the complete course.

October to April covers the period of night school teaching and this leaves the students six months of the year without study or training. We do not contend that these students should be in school but we do maintain that the teachers should not have to make a complete review before they begin to take up new work in the fall. We always have to spend a great deal of time getting the students who have completed certain books, prepared to take up other work, just because they have forgotten many things they learned in the previous class. We plan to line up our teachers so that they will send out once each month, certain problems to their students bearing directly on the fundamental things they had studied before. In this way the students will be ready to start where they left off. We also expect to run general problems in the plant newspaper so that interested students may work them out. To keep up the proper interest in education we hope to run educational reels in the plants at noon time or plan in some like manner to keep the interest at a high pitch. We will also run articles on education in the plant newspaper.

If we can, in the ways suggested, keep up interest in night school work, it will be a comparatively easy plan to organize classes in the fall of 1922 along the lines we have outlined.

But we are not treating the girls right in our vocational education program in our community, and we want to offer them courses at our next organization. We have had several petitions from the girls for textile courses (general) but more especially for courses in home making. The field among the girls and women in vocational education is practically untouched, and it is hoped that we can make the girls' classes a vital part of our future work.

In addition to the vocational night classes which we have conducted we have done quite a bit of training with the foremen in groups—large and small. Early in 1920 we instituted a three months' training course along the so-called inspirational lines and enrolled 176 men. The course served to awaken in them a real interest in the world of business outside of their own very small sphere of activity. In several instances the ideas gotten from the books were put into practice in the departments and the group of men as a whole showed a distinct improvement in two very valuable traits—namely, loyalty and cooperation. The greatest benefit (so far as our educational program is concerned) that was derived from this course was the interest in education and training that was aroused among the foremen and superintendents. It makes our job much easier now.

Following this fairly general course we tried to overcome the objection to a course of this kind by adapting the idea of the course to our own plant problems. So we rewrote the problems of this course in the light of our own conditions and enrolled 130 sub-foremen and minor executives for a second three months' course. In this case we used our own men as lecturers. The combination worked exceedingly well and was a distinct success.

We are now conducting foremen conferences in our plants during the working hours for small groups of foremen. These conferences are conducted along the lines taught at the 1921 Minneapolis Conference and are proving to be very interesting and quite helpful. At the present time we have two of these conferences going and will add others as quickly as the time can be found for them. In these conferences we use no text books or lecturers. We simply analyze and discuss the foremen's jobs from the standpoint of their responsibilities. Some of the typical conferences that have been held have been "Farm Labor," "Leadership," "Man Qualifications," "How to hire a man," "Job Analysis," etc. The foremen, after the first meeting, enter into the spirit of the discussion and many interesting and valuable points are brought out. These conferences are held once each week in the separate plants but we are just completing a two weeks' intensive conference at one of our Virginia plants put on by a State Department representative.

This type of training seems to be the most vital of all the methods and is proving to be of greater value as we continue the meetings. Its greatest value is in teaching the foremen "to think." We feel that if the training does that with any degree of success it is immensely worth while.

A color card for du Pont naphthanil colors on cotton yarn is being distributed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, showing sixteen shades made by combinations of these various dyes.

Foremanship Training and Its Results

BY ROBERT W. PHILIP, ASSOCIATE EDITOR.

Within the past year a new phase of industrial training work has been developed for the use of southern cotton mills. This new development is foremanship training—equipping the superintendent, the overseer, the second hand and the section man to be more valuable, to himself and to his mill, and training him for a better execution of his duties and responsibilities as the "key man" in the mill.

Previous to the inauguration of this new phase of training, the work of the Federal Board for Vocational Education, under whose auspices it is conducted, had been devoted largely to classes in the various mechanical and industrial lines, under the regulations of the Smith-Hughes Act. This instruction is mainly elementary and for the most part deals with the operatives in the mill.

Realizing, however, the important and unique position occupied by the foreman in the plant, as "the man next to the men," the point of contact between the management and operatives, and his great responsibility of securing in the best way a production with a profit, this new phase of service has been developed and is being offered to the mills of the textile industry. Its purpose is to give training to the foreman along lines so essential for the proper carrying out his duties and yet aside from strictly technical subjects—a feature to which too little attention has been given generally in the past.

Under the plan as developed, this training work is available to the mills with absolutely no expense to them for the service, all expenses being provided for by funds appropriated under the provisions of the Smith-Hughes Act. While yet in the stages of development, this training work has been conducted at a number of prominent mills, and has received sufficient demonstration to prove its value and possibilities.

This article will describe mainly the work and plans instituted by the Board for Vocational Education in Georgia, but it should be stated here that under the provisions of the Act, a similar service is available to mills in other states where Vocational Education Boards are maintained. Furthermore, the plan which is described herein is similar in its working details to the methods used in other states.

The foremanship training work in Georgia is operated under the direction of J. F. Cannon, state supervisor of trade and industrial education, Georgia School of Technology, Atlanta, and W. M. McLaurine, professor of industrial education. The work is conducted on the conference method. That is, the representative of the Board comes to the mill and acts as leader. He meets the foremen at a specified time, and they discuss subjects vitally connected with the work of the foreman in his every-day work. A series of conferences usually consists of from six to twelve meetings, lasting from one to three hours each. They are conducted in or near the mill, on mill time or on operatives' time as the agreement may be. A satisfactory method of holding the conferences is to have the Board representative meet with the men one or two times a week on a stated day—Tuesday afternoon at two o'clock, for example—which extends a unit of twelve meetings over a period of six or twelve weeks.

No questions affecting mill policies, wages and hours, etc., are allowed to develop for discussion, nor are technical problems pertaining to the operation of machinery discussed. Among the subjects taken up, however, are such important topics as hiring help, cooperation, foremanship qualifications, duties and responsibilities, labor turnover, waste, incentives to production and interest, safety and accidents.

It is now planned to divide the various phases of work into units composed of six to twelve conferences or meetings each. Two units will be conducted in each mill during the year, if desired, and at the conclusion of each unit the Board will award a certificate to each member of the conference group who has made a good attendance and manifested an interest in the work. At the conclusion of the course, that is upon the completion of all the units, a large certificate will be awarded.

The units listed below will give a general idea as to the subjects discussed in the course:

Unit I—12 Conferences—General Introductory. (These are the first meetings held at a mill by the Board representative. At this time he presents the plan of the course to the foreman, discussing briefly the objects of the course and the subjects to be taken up, and begins mapping out the course of procedure for subsequent meetings.)
Unit II—6 Conferences—Fixer Responsibility.
Unit III—6 Conferences—Waste.
Unit IV—6 Conferences—Safety and Accidents.
Unit V—8 Conferences—Job Analysis.
Unit VI—5 Conferences—Cooperation.
Unit VII—4 Conferences—Labor Turnover.
Unit VIII—4 Conferences—Social Conditions.
Unit IX—5 Conferences—Foreman Responsibility.
Unit X—6 Conferences—Instructing Responsibilities.

The procedure at a meeting is somewhat as follows: After some objective or subject for discussion has been chosen, the leader proceeds by means of cases in hand, or by cases brought forward by the men, or by points for discussion, to analyze the problem with the men and have them express their opinions on the matter from all angles Then at the conclusion of the conference, a summary of the discussion is made and each member of the conference is asked to try some of the suggestions and see how they work out in actual practice. Inasmuch as each mill or plant has its own peculiar problems, no attempt is made in this work to prescribe a course of instruction that will apply to all mills. On the other hand, the conference leader generally plans his conferences after the first introductory meeting, because as a general rule it has been found that the various needs and problems of the particular mill, in which the men are naturally most interested, will develop at this first meeting.

It has also been found that much more satisfactory results are secured by turning the meetings into a round-table discussion, in which the men themselves participate, rather than have the conference leader deliver a prepared address. This discussion plan, therefore, has been adopted, and the leader merely conducts the discussion and has sub-

jects upon which discussion is desired, as well as cases in hand to illustrate his points. It has developed, however, that when the men get together in these meetings, with the proper leadership, the interest seldom lags because the foremen will themselves bring forward cases of local interest, which naturally adds to the value of the discussion for the particular mill and its foremen.

The first effort in this new work by the Board for Vocational Education in Georgia was made last September at the Exposition Cotton Mills, Atlanta, when an introductory unit of twelve conferences was conducted. In this course twelve men from the mill took part, including the superintendent, the overseers, head bookkeeper, storeskeeper and buyer. Two conferences were conducted each week, one on mill time and one on employees' time, and the results were so noticeable that this Spring the mill held another series of conferences. The conferences at these mills were personally conducted by Professor McLaurine.

George S. Harris, president and general manager of the Exposition Cotton Mills, is very enthusiastic concerning the value of this foremanship training course to the mills. In a statement regarding the benefits of the conference plan to his mills, he sums these up as follows: "A clearer understanding on the part of the men with reference to the mill management; a closer relationship between the foreman and the mill officials; a clearer insight into their own work, and the most valuable part of the whole thing is a better understanding among the men themselves."

Mr. Harris also was very commendatory in discussing the capabilities of Professor McLaurine for handling the work. "I consider Professor McLaurine particularly well equipped for this work," said Mr. Harris. "He came out first and conducted a series of classes which included the overseers only, and then he came back and held another series of classes in which we reached out and took in the second hands and section men, and in a 60,000-spindle mill, we had an average attendance of 40 men at the classes, which were held in the evening, and with no other inducement than Professor McLaurine's personality and the benefits to be derived by the men in discussing the subjects with him."

Following these conferences, a general conference was conducted in Atlanta at Georgia Tech, which lasted for two weeks and consisted of two sessions of three hours each day, and the purpose of which was to train conference leaders and equip men from mills over the state to return home and carry on the work at their own plants. This group consisted of fourteen men from various mills, but principally from the Bibb Manufacturing Company. At this general meeting, conference methods and content were discussed. One of the overseers attending from the Bibb Manufacturing Company, Harry Hamilton, made an interesting report concerning the meeting upon returning home. He reported in part as follows:

"One of the main ideas brought out was the proper selection, placing and instructing of operatives. Few realize the importance of such procedures. We hear a lot about labor turnover—this is one of the main causes for a large turnover. The overseer should feel his responsibility at this point. Proper instruction of help tends to decrease labor turnover, accidents and cost per pound. When a new man is being taught, and while he is becoming proficient, it is costing the company money. An overseer should first inform himself as to the amount of intelligence a job requires. He should then use a test to determine that degree of intelligence and avoid placing men in positions where they will be handicapped by slow or retarded mentalities. An analysis of reasons for failure on jobs seems to indicate that it is not wholly due to lack of application, indifference or carelessness, but that it is sometimes due to the lack of mental equipment necessary in the job.

"Another important point brought out was the value of cooperation. One particular department may have cooperation, but not be cooperating with the next department. Two overseers in different departments who have a grievance against one another do not, as a rule, cooperate. The result is an inferior product and loss of production, and the man's value with that particular concern has dropped below par. One of the superintendent's duties is to see that a case of this kind is quickly remedied. There are numerous ways of cooperating. Among them are: carrying out the company's policies, not knocking your company or other departments, transmitting orders intelligently, being a part of your organization, having a plant pride, making a careful and correct report when called for, appreciating the other fellow's troubles and helping him out—and, above all, don't pass the 'buck.'

"As we all know, waste is one of our big problems. Many are the ways that have been devised to prevent it, but we still have it in a greater or a smaller degree. To remedy anything you must first find the cause. In Atlanta, we went into an analysis of the causes of waste through the mill. After a thorough discussion of the matter, it was decided that carelessness was the main cause, and that it would require eternal vigilance on the part of the superintendents and overseers to keep it to a minimum. In my estimation, one of the best ways to fight waste would be for the superintendent to meet with the overseer, second hands and section men of each department and go into an analysis of waste in each process of the manufacture of the product, and classify it as reduceable, unavoidable, workable or unworkable. We know there is no use to try to lessen waste if it is unavoidable, so the best way to get at the crux of the matter is to analyze it."

Another interesting section of Mr. Hamilton's report refers to the requisites of a foreman as determined in the discussions at this conference. "As to the foreman as a leader," he said, "they have laid down the following requisites: common sense, ability, initiative, judgment of human nature, good disposition, being democratic, and good health.

"Too often a foreman will discharge a man for the errors which he commits, whereas if the truth were known the foreman himself is in error by not giving the proper instruction or directions. A case was brought out of two workmen of a low degree of intelligence loading paint on a truck that was easily overturned. The foreman had only told the men to load it, and take it to a certain place, not taking the trouble to explain how it was to be loaded. After loading the paint on one end, the man found it was overbalanced and asked another workman to ride on the other end to balance it. As they were passing an elevator, the man riding saw the foreman coming and jumped off. As a result the paint was deposited down the elevator shaft, a total loss. The foreman fired both men. Our contention was that the foreman himself was at fault. First, by not giving proper instructions and seeing that they were

carried out, and second, for firing the men. These men had just had an example of the result of poor loading of trucks, whereas two other men with the same degree of intelligence were liable to make the same expensive mistake."

The main object of the meeting—to train conference leaders for local communities—was emphasized, and Mr. Hamilton reported the following in this connection: "Another matter that seemed to be of prime importance in a superintendent's or foreman's duties was the importance of intelligently conducting a conference, or, as we say, a meeting. It seems that the purpose of a conference at times is not achieved, due to the bad handling of the subject or the lack of preparation. After much discussion the following rules were suggested for the proper handling of conferences: First, the conference leader must have a main objective; second, he must determine the characteristics of the men in the group; third, he must himself have the right attitude toward the conference; fourth, he must determine ways and means of obtaining sub-objective and objective by having actual cases for discussion, or supposed cases; fifth, he must get the attention of the group and maintain interest; sixth, he must keep the discussions on the subject; seventh, he must use the right material effectively; and eighth, he must take advantage of opportunities as they present themselves."

Thus, while this particular conference was mainly for the purpose indicated, at the same time the plan of procedure and a majority of the topics discussed were similar to those treated at the individual mill conferences, and the foregoing quotations give an idea as to the manner in which the conferences are held and the discussions developed, together with the conclusions brought out of the discussions.

In addition to the conferences held at the Exposition mills, the work accomplished thus far by the Georgia Board has included a general conference at Augusta, in which 65 men were enrolled. These foremen represented the John P. King Mfg. Co., the Sibley Mfg. Co., the Enterprise Mfg. Co., and the Augusta Factory. A similar conference was subsequently held at the Social Circle Cotton Mill, at Social Circle, and another at the Porterdale plant of the Bibb Manufacturing Company. These two series of conferences were conducted entirely on mill time.

The Bibb management were very much pleased with the course conducted at their Porterdale mill, and indicated a desire to have similar conferences held at the other plants operated by them. The Porterdale conference was conducted by Professor McLaurine, and in a letter written during the course of the conference, H. W. Pittman, general superintendent of the Bibb Manufacturing Company, said: "Mr. McLaurine has been conducting a foremanship conference at Porterdale for the last several weeks, and, as the writer understands it, he will probably complete the course there the coming week. We are all very much gratified with the progress that has been made. Our representatives at Porterdale speak very highly of the work being done by Mr. McLaurine."

W. L. Phillips, superintendent of the Social Circle Cotton Mills, expressed similar satisfaction concerning the results of the course conducted at his plant. In discussing the classes at his mill, Mr. Phillips said: "Mr. McLaurine conducted a very successful unit of courses at Social Circle recently, and I was very much pleased with the results obtained. We would have all our overseers meet from an hour to an hour and a half once a week during work hours to study these courses, and we feel the time lost was worth the price, as our overseers are different men today. They are broader men and have different views in regard to managing help than they did heretofore. I can't speak too highly for foremanship training in textile mills."

A successful series of conferences was also held under Mr. McLaurine's direction at the Moultrie Cotton Mills, and another series of meetings was conducted at The Trion Company, at Trion. The Callaway mills at LaGrange held a foremanship training conference which was conducted by C. W. Coleman, of LaGrange, who has received leadership instruction in a general conference similar to the Atlanta meetings referred to, and another Callaway mill to have a similar course was the plant at Manchester.

The course at LaGrange covered a period of 16 weeks, one two-hour class being held each week. The class was composed of about 40 overseers from the Unity Cotton Mills, the Elm City Cotton Mills, the Unity Spinning Mills and the Hillside Cotton Mills. The major part of the class leadership was done by Supt. C. W. Coleman, of the Southwest LaGrange Schools, with the assistance of Professor McLaurine.

A report from the management of these mills concerning this conference states that "the interest in the course was good throughout, and the attendance held up well. This was doubtless partly due to the cooperative attitude of the management, the superintendents consistently encouraging their men's attendance and often coming to the sessions themselves.

"The beneficial results of the work have been evident in several instances. 'My men are *thinking,*' said one manager who returned from a protracted absence shortly after the completion of the course. One foreman has recently installed on his job a full system of records based upon ideas gained from the course. Several have requested the arrangement of further work along the same line."

In regard to the general value of this type of training, the report further stated, "We believe that such a broad survey is of great value in stimulating mental growth and in developing a real application of the greatness of industry. Quite as important is the contact which it gives the foreman, primarily a teacher, with a science and technique of the teaching process. Such a study we regard also as a necessary pre-requisite to the most effective attack upon purely local problems. Our next undertaking with this particular group of men will be a more informal and concrete consideration of their daily routine, dealing with questions of their own selection."

As indicated, conference work of this same character has been carried out for textile mills in other southern states. From June 12th to 24th, inclusive, a conference of overseers and foremen was held at the University of Alabama, Tuscaloosa, Ala., under the supervision of Thomas E. Quigley, regional agent of the Federal Board for Vocational Education; Ben E. Harris, state supervisor of trades and industries for the Board; and Prof. V. P. McKinley, head of the vocational department of the University of Alabama. This conference was attended by twelve overseers from plants of the Avondale Mills, and a number representing the Tallassee Mills.

A short conference was also held last November for the assistant superintendents of the Fairfax, Shawmut and

other plants of the West Point Manufacturing Company.

In Greenville, S. C., a conference was conducted from April 17th to 28th for overseers of a number of the mills in and around that city, and a foremanship training course was held at the mills of the Carolina Cotton and Woolen Mill Company, Spray and Leaksville, N. C., the results of which are commented upon in the article by L. H. Hodges in this issue.

In April of this year, from the 2nd to the 15th, the Fieldale (Va.) plant of the Carolina Cotton and Woolen Mills Company conducted a foremanship training conference, under the auspices of the State Board for Vocational Education of that State, the conference being arranged through Raymond V. Long, supervisor of industrial education. I. R. Anderson, of the state board, was the conference leader. The course at these mills, consisted of twelve meetings, held in the evenings, and 22 representatives of the mill took part. There was a manifest interest during the course, and the discussions were productive of many good results. Subjects relating to the responsibilities of the foreman were discussed and conclusions drawn from the discussions. Among the matters taken up were carelessness, cooperation, relation of the foreman to the worker outside of mill hours, leadership, and similar important topics.

The foregoing presents a part of the work that has been accomplished by the Vocational Boards in the southern states in the training of overseers, second hands and other foremen. The plan and opportunity is submitted to the mill executive and to the foreman as well; for the former, as has been demonstrated in the instances given, it holds much of value from the standpoint of a better equipped and more cooperative corps of foremen; and it will better fit the individual foreman for his daily supervisory and managerial duties in the mill.

It should be emphasized in conclusion that any mill in a state having a Vocational Board can avail itself of this service, *without cost to the mill*, by communicating direct with the state supervisor of the work in the state in which the mill is located. In Georgia, as stated, the work is in charge of J. F. Cannon, state supervisor, trade and industrial education, Georgia School of Technology, Atlanta, Ga. The names of the state supervisors in other southern states follow: North Carolina, George W. Coggin, State Board for Vocational Education, Raleigh, N. C.; South Carolina, Harold B. Adams, Columbia, S. C.; Tennessee, James Arentson, State Capitol, Nashville, Tenn.; Alabama, Ben E. Harris, Montgomery, Ala.; Virginia, Raymond V. Long, Richmond, Va.; Mississippi, M. D. Broadfoot, State College, Miss.; Louisiana, H. G. Martin, director, Delgado Trade School, New Orleans, La.; and Texas, N. S. Hunsdon, Austin, Texas.

The Design and Manufacture of Fustains

BY T. WOODHOUSE AND A. BRAND.

Constitution Cords.

In previous contributions of this series, examples have been given of at least four distinct types of corduroy, viz., velvet cords, thickset cord, corduroys proper or Genoa cords, and backed corduroys. Another variety, which is in more or less common use, is known in the weaving industry as "Constitution Cord."

Constitution cords differ slightly in construction from corduroys proper, the chief variation being in the method of securing the pile picks to the ground fabric. The filling is generally inserted in the proportion of two pile picks to one ground pick. One of each pair of pile picks is bound into the base fabric in the ordinary manner, i.e., it is held by one warp thread only in each group or repeat; the other pile pick is stitched at two or more points, and whereas the first pick, when cut, produces an ordinary pile tuft as at A, Fig. 1, the second, when similarly treated, produces a tuft of the fast or lashed back variety, similar to B in Fig. 1.

A further difference lies in the number of warp threads in each group which takes part in the actual stitching of the pile picks. In the four types before mentioned, only two warp threads in each group are used for binding the pile filling, but, in constitution cords, four or more threads in each group are so employed.

Three typical examples of constitution cord weaves are illustrated in Fig. 40. The point paper design at A shows 4 repeats of one unit which is complete on 12 threads and 12 picks; the marks used have the same significance as in the other illustrations used throughout these articles. The design may be drafted on 8 harnesses, and one suitable weaving plan and the corresponding draft for it appear at B and C respectively in the same figure. It will be observed that the ground weave is the 2 up 2 down or common twill, and that one pile pick out of each pair interweaves with three warp threads; the arrangement will thus result

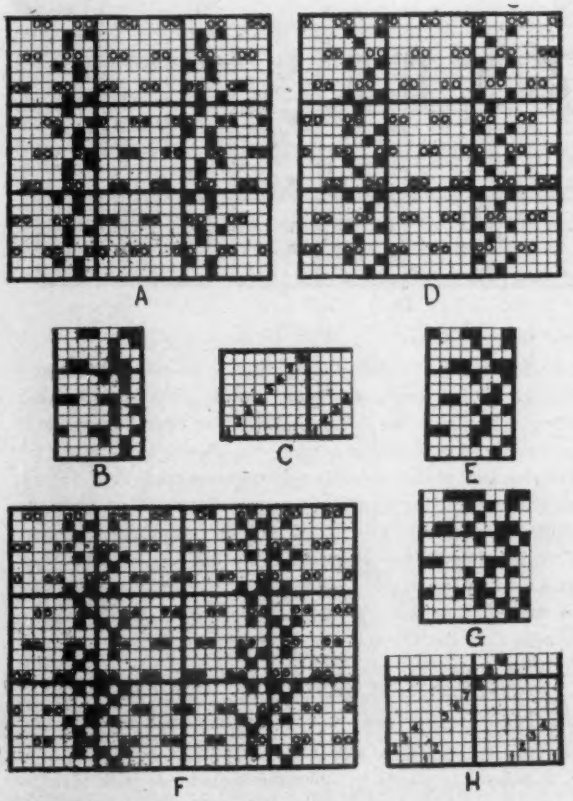

FIG. 40.

in a fast pile tuft when this pick of the fabric is cut, whereas the other pick, which is stitched at one point only, will form a pile tuft of the ordinary variety.

The weave of which four repeats are shown at D, Fig. 40, is similar in most respects to that in the design A in the same figure. It differs solely in the method of stitching the fast pile pick and in the length of one set of floats. In this case, the fast pile pick interweaves with four warp threads (under 1, over 2, under 1); the order thus slightly alters, as stated, the length of the filling float, and, consequently, the length or height of the pile tuft ultimately produced by cutting. Design A, in alternate pile picks, exhibits filling floats over 11 threads and over 9 threads, whereas design D produces corresponding floats over 11 threads and 8 threads. One suitable weaving plan for the design D is given at E, and if this were used, the draft would be identical with that shown at C.

A third example of constitution cord appears at F, Fig. 40; the point paper design thus indicated shows four repeats of a unit weave on 16 threads and 12 picks. It differs from the first two examples in that the pile filling floats are longer, and will consequently produce, when cut, a longer pile tuft in the same sett of warp, while it also differs in having six instead of four warp threads in each group for stitching in the fast pile picks. One weaving plan for this design appears at G, and the draft at H.

In all three examples in Fig. 40, and in all weaves of a similar nature, it will be found a fairly safe practice in drafting to put the pile stitching threads on the back harness, and to retain the front harnesses for those warp

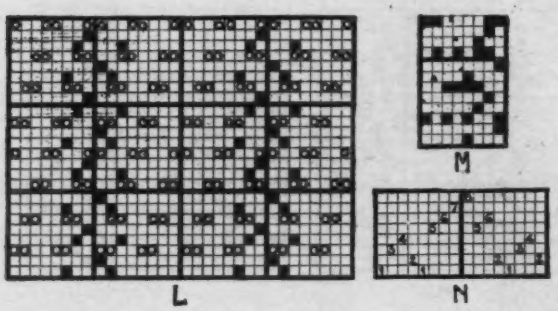

FIG. 41.

threads which form, with the filling, the ground fabric only between the respective groups of pile binding threads. After this is done, the former group may then be arranged so that the first harness carries the largest proportion of threads, and each succeeding harness carries diminishing proprotions, so far as this procedure is possible. For example, in draft H, Fig. 40, it will be found that the pile stitching threads are carried on the 5th to the 10th harnesses, while the threads which form the ground fabric only are drawn through the first four harnesses. It will further be seen that the 1st and 2nd harnesses each carry 3/16 of the total warp, that the 3rd and 4th harnesses each carry 1/8 of the warp, while the remaining 3/8 of the warp is distributed equally over the remaining six harnesses, i.e., over the 5th, 6th, 7th, 8th, 9th and 10th.

Besides the peculiarities of the lashed pile pick in each group, the constitution cord weaves, such as are illustrated in Fig. 40, possess the property of producing a much more rounded cord than any of the ordinary weaves. This is entirely due to the variation in the length of the pile filling floats, and to the relative positions of these floats with reference to the cutting position.

The weave A, Fig. 40, has pile picks over 9 threads and over 11 threads respectively, the former being the lashed pick. When the cutting process is complete, the lashed pick is severed in the proportion of 4 and 5 threads, while the ordinary pick is divided into two lengths corresponding to 5- and to 6-thread floats respectively. This procedure gives three lengths of pile tufts, corresponding to floats of 4, 5 and 6 threads, and produces a correspondingly rounder formation of the cord than where only two different lengths of float obtain.

Weave D, Fig. 40, gives similar results; floats of 8 and 11 threads produce tufts equivalent to 4 and 4, and 5 and 6 threads respectively, again giving three distinct or different heights of pile tufts.

The third weave F, Fig. 40, illustrates an extension of the procedure. The floats in this weave are over 7 and 11 threads respectively, and these are divided into parts corresponding to 3 and 4 threads, and to 5 and 6 threads. These produce four lengths or heights of tufts, and give a correspondingly better effect. A fourth example of a similar nature, but with longer floats, is given at L, Fig. 41; four repeats of the unit weave, which is complete on 16 threads and 12 picks are shown. One satisfactory weaving plan is supplied at M, and the corresponding draft appears at N in the same figure. The pile floats are over 11 and 15 threads respectively, and these divide up into lengths corresponding to 5 and 6 threads, and to 7 and 8 threads.

Figured Corduroys.

It is unusual to attempt any degree of ornamentation in the majority of the different kinds of corduroy fabrics; nevertheless, certain varieties are occasionally produced in figured patterns with the aid of a dobby or a Jacquard. Due to the development of pile tufts in longitudinal rows, the type of ornament employed is preferably of a rectilinear nature, and results are always most satisfactory when the main lines of the pattern are parallel or else at right angles to the selvages. Straight sloping lines can be produced fairly successfully, but it is almost impossible to obtain satisfactory results with curves of any kind; hence these should be avoided if possible. The ornament should be of a purely formal, conventional or geometric nature, and the scope of the artist-designer is very circumscribed indeed on this kind of work.

The principle employed in the production of figure and ground is practically identical with that made use of in the formation of figured velveteens; indeed, the weaves used are invariably of the velvet cord type and these, as already shown, have much in common with the regular velveteen structures. The figure portion of the pattern is developed by one of the regular velvet cord weaves, such as those illustrated in Figs. 17, 18 and 19, while the ground portion is produced by causing the pile filling to float on the *back* of the fabric instead of on the face. The principle and its application may be more thoroughly examined by reference to a concrete example.

Let A, Fig. 42, be one repeat of a pattern which it is desired to develop in figured velvet cord by means of the 6-thread by 10-pick velvet cord weave, one form of which is shown at B in the same figure. It should be noted that the painted areas in the pattern A represent the *ground*

of the fabric. The velvet cord weave is of the plain back variety, and has the filling inserted in the following order and in regular succession:—4 picks of pile filling and 1 pick of ground filling.

It is assumed that the pattern A is to be 3 inches square, that is, that it will occupy 9 square inches in area in the finished cloth, while the setts are to be—48 threads per inch of warp, and 280 picks per inch of filling. The unit design will, therefore, be complete on:—

3 in. × 48 threads per in. = 144 threads, and

3 in. × 280 picks per in. = 840 picks.

It need hardly be said that for a design of this size it would be most satisfactory in all probability to employ

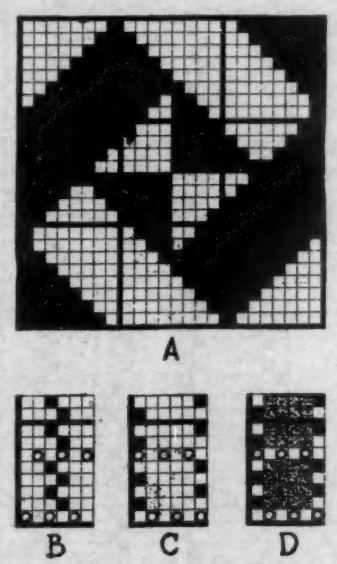

FIG. 42.

a Jacquard, unless the number of harnesses necessary should work out to a reasonable number, and that the corresponding draft be sufficiently simple.

In the pattern shown at A, there are 24 vertical rows of small squares, and in the construction of the working design, these have to be transferred to 144 warp threads. Hence—

$$\frac{144 \text{ threads}}{24 \text{ rows}} = 6 \text{ threads per vertical row; i.e.,}$$

each vertical row of small squares in the pattern A represents six warp threads in the working design, or one group since the base weave contains 6 threads and forms one row of tufts.

Again, there are in pattern A, 24 horizontal rows of little squares, which in the working design have to be accommodated on 840 picks; therefore—

$$\frac{840 \text{ picks}}{24 \text{ rows}} = 35 \text{ picks per horizontal row,}$$

that is, each horizontal row in A represents 35 picks, or 3½ groups of 10 picks each, or 7 smaller groups of 5 picks each.

When choosing apparently suitable setts and weave for the development of any particular design, it is practically essential—

1. That the number of warp threads per vertical row shall be an even multiple of the number of threads in the base weave; and—

2. That the number of picks per horizontal row shall be an even multiple of the number of picks per group in the base weave.

One group of picks is taken to include—

n pile picks + 1 ground pick.

In the present case, n = 4; hence, there are 4 pile picks and 1 ground pick in each group.

Once these particulars have been established the next step in the process involves the production of the complete working design, from which the Jacquard cards would be cut; if the design were capable of being produced by means of a dobby, the draft and weaving plans would be made, and the particulars of the latter transferred to the dobby cards or their equivalent.

Figure 43 shows part of the complete working design for the pattern A in Fig. 42; it includes the first 96 threads—starting to count from the left—and the first 96 picks, starting to count from the bottom. One complete unit of the base weave employed in the figure portion of Fig. 43 is shown at B, Fig. 42, but it is not convenient to use the weave directly in this particular form. It is much more satisfactory to rearrange the plan B to the plan shown at C in the same figure. It will be observed that the plan C begins and ends with a binding warp thread, and insures that the boundary of the figure portion is well defined in the direction of the warp threads.

For a similar reason, it is advisable to have the boundaries in the direction of the filling yarn limited by ground picks. The figure portion of the design should thus move, in the present instance, in steps of six in the way of the filling, i.e., across the cloth, and in steps of five picks in the way of the warp, i.e., along the length of the fabric. The remaining unit D, Fig. 42, is developed from the plan C in the same illustration; extra marks, shown stippled, are added to cause the warp instead of the filling to float on the surface, that is to say, to cause the pile filling to move to the back of the fabric in the ground portions.

In the actual making of the working design, some procedure similar to the following may be adopted:

1. Indicate all the ground picks by a suitable mark, and then fill in the plain weave as shown by the circle in Fig. 43.

2. Divide the total number of warp threads into groups of six threads each, and mark in the pile stitching points on the first and last threads of each group, after the manner shown at plan C, Fig. 42.

3. Define the limits of the figure and ground, taking care to move in steps of six and five respectively as indicated above.

4. Fill in the extra marks in the ground portions; these are shown stippled in the plan D, Fig. 42, but, together with the pile stitching points, are shown in solid black squares in Fig. 43.

Moleskins.

While velveteens and corduroys may be regarded as typical examples of true fustians, there are other varieties which, unlike these particular two, possess no characteristic pile formation. One of the chief of these less complex fabrics is that known by the name *moleskin*. This fabric, in its usual setts and counts, and partly in its weave structure, much resembles corduroy; indeed, the two fabrics are often used for identical purposes, e.g., in the production of clothing for moulders, masons, laborers, navies, and other

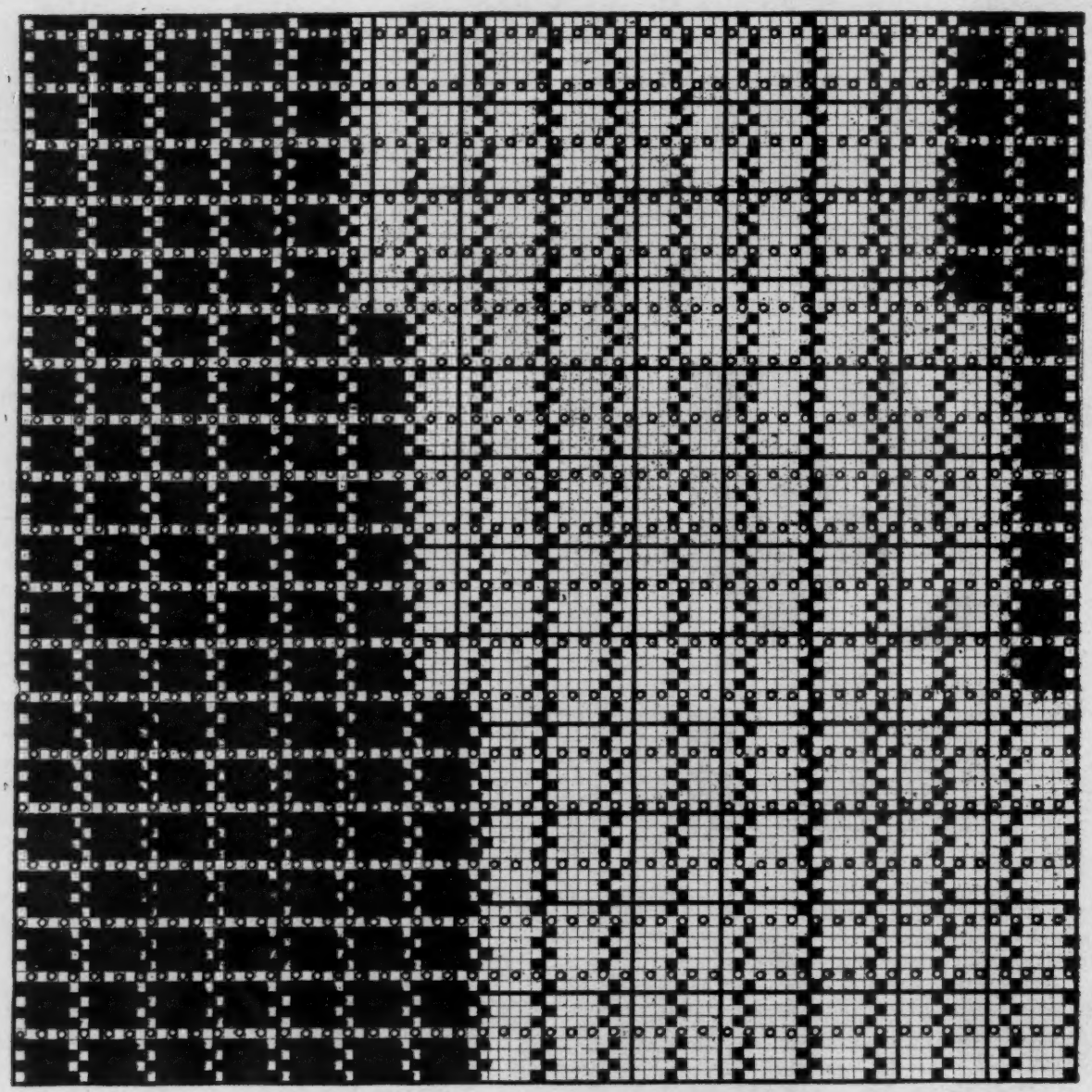

Fig. 43.

workers engaged in occupations where outer clothing is liable to be worn out at a high rate.

Moleskin is a smooth-surfaced, heavy, closely-woven texture, with something of the nature of soft leather in its general appearance and handle. Like corduroy and velveteen, it is made with one series or set of warp threads and with two sets of filling threads; the two latter are identical in fiber and make, and differ only in function. One set of filling threads is used to form a ground structure, while the other set is stitched into this basic fabric at regular intervals, and forms a compact cloth, the face or upper surface of which is practically composed of filling. The ground weave is almost invariably a 3-thread twill, while the face weave may be regarded as a modified form of weft flush satin or sateen. The ground filling interweaves with all the warp threads, but the face filling is stitched in usually on alternate warp threads only. The proportion of face picks to back picks is almost always two to one, but occasionally it may be three to one.

A typical example of a regular moleskin weave is given at A, Fig. 44, where two repeats each in the way of the warp and of the filling are shown. The ground weave is the 2 up 1 down twill to right (prunelle) while the face weave may be regarded as a modified form of a 6-thread satin, or as three distinct picks of the 1 up 5 down weft flush twill. The picks are inserted in the order and proportion of two picks of face to one pick of back filling. The unit weave is complete on 6 threads and 9 picks, and is identical with the weaving plan shown at B, Fig. 44; immediately below the weaving plan B is the corresponding draft C, which is, naturally, straight over 8 harnesses.

Little or no attempt is made to treat moleskin decoratively by alteration of the weave structure, as very little departure from the orthodox methods of interlacing is sufficient to destroy the characteristic features. One such departure is, however, carried out occasionally. This consists

in introducing into a standard moleskin weave, two or more threads which are caused to interweave in a distinctly different manner in order to produce striped or lined effects.

One example of this type of design is given at D, Fig. 44, in which are four repeats of the unit weave. This design consists of two repeats of weave A, Fig. 44, alternated by small groups of two threads interweaving in such a manner as to obtain a maximum of warp on the surface; in this case, two threads of the 8 up 1 down warp flush weave are thus employed. One suitable weaving plan and the corresponding draft appear at E and F respectively.

Occasionally, moleskins are dyed, and then printed with small characteristic designs in an excellent imitation of worsted suiting. The fabric is chiefly employed in the making up of men's clothing.

Good quality moleskin contains from 36 to 42 threads per inch, and from 380 to 420 picks per inch. The warp is almost invariably 3-fold and, in general, from 3/20s to 3/24s cotton; the filling is invariably single and usually 12s, 14s, or 16s cotton, with a small amount of twist.

Moleskins are also made in lighter textures than are indicated in the foregoing paragraphs, and in slightly different weave structures, when they are known as beaverteens. Four repeats of a typical beaverteen are shown at G, Fig. 44; the design is arranged with three picks of face filling

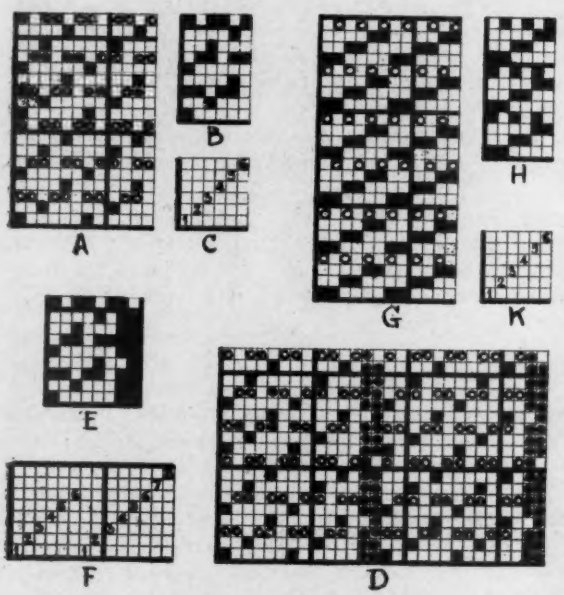

FIG. 44.

to one pick of back filling. The face weave is a weft satin derivative, and is identical with that used for swansdown or imperial sateen, which is still another variety of fustian. The back weave consists of two opposite plain picks arranged two of the first pick and one of the second pick. The ground structure may also be regarded as being composed of one thread of the 2 up 1 down twill, alternating with one thread—an opposite or cutting thread—of the 1 up 2 down twill. One satisfactory weaving plan, which in this case also is identical with the unit weave, is shown at H, Fig. 44, and K is the corresponding straight draft over 6 harnesses.

Beaverteens are generally arranged with either two or three face picks to one ground pick. The ground weave is usually that shown at G, Fig. 44, or else the 2 up 1 down twill as in moleskins. For instance, a common example has the same weave as G, but is based on the 2 up 1 down twill as at A or D, and has two picks of face filling to one of ground filling. A characteristic feature of these fabrics is that they are usually dyed or printed—sometimes both—and are invariably raised on the back to obtain a short, soft, woolly nap. As regards setts and counts, good qualities contain, say, 28 to 36 threads per inch of 2/16s to 2/20s cotton warp, and from 240 to 300 picks per inch of 16s to 20s single cotton filling.

Miscellaneous Weft-Pile Fabrics.

Besides the various textures already illustrated and described, and which are all more or less standard struc-

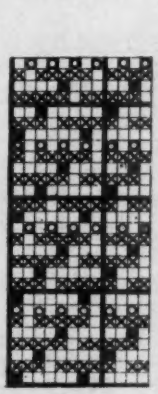

FIG. 45.

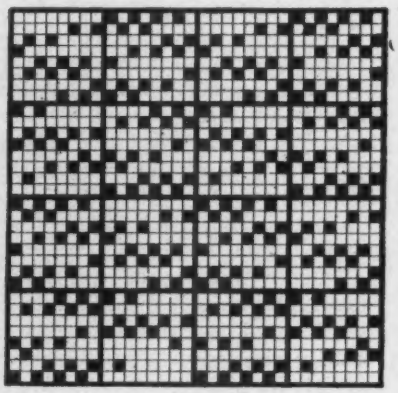

FIG. 46.

tures for the particular class of fabric, there are a few special textures which it may be profitable to mention.

The various purposes which are fulfilled by velveteens, such as articles of outer apparel, etc., require the characteristic pile on the outer surface only. But where this fabric is used for the making of portieres, curtains, etc., which are readily seen from both sides, it becomes necessary to have some form of ornamentation on both sides. This may, of course, be arranged simply by doubling the ordinary fabric when the curtain is being made, but it may be done somewhat more cheaply by using a reversible fabric, that is, one in which the pile tufts are formed on both sides of the cloth. Fig. 45 shows two repeats each way of a 6-thread 14-pick weave for such a fabric. The face pile picks are indicated in solid squares; the back pile picks are shown by crosses, while the ground picks, as usual, are marked in circles or rings. The ground weave is plain, while the pile picks form floats over five warp threads. The odd-numbered warp threads, 1, 3, 5, etc., are used to stitch in the face pile picks, while the even-numbered threads, 2, 4, 6, etc., are employed to bind in the back pile picks. Since marks are taken to rise, the stitching points on the back picks are actually represented by the blank squares on these particular picks.

The order of inserting the filling is nominally 6 picks of pile to 1 pick of ground, but the 6 pile picks appear alternately on the face and the back of the fabric. While it is readily granted that there is not a large business done in such fabrics, the design illustrates that principle upon which such cloths may be woven when required. To secure the necessary density of pile on both surfaces, there must be a high ratio of pile picks to ground picks, and, as a

high ratio tends to looseness of structure, the necessary degree of security for the pile tufts must be obtained by the use of comparatively large numbers of picks per inch. It will be understood, of course, that the terms face and back picks are used relatively only, and have reference to their positions in the loom fabric rather than in the finished cut fabric.

A comparatively large trade is done in textile imitations of various kinds of fur, comprising lambskin, sheepskin, dogskin, sealskin and the like, besides the various types of plush, double plush, reversible plush, and so-called plushette fabrics. In the better qualities, these fabrics are plausible imitations of the real thing, but since most of them are warp pile fabrics, they do not fall within the scope of the present series of articles.

A few varieties, however, are made in weft pile textures, and Fig. 46 is given as a typical example. It is a 16-thread 32-pick imitation lambskin, and two repeats in the way of the warp are shown. The design cannot be reduced but requires the full 16 harnesses with, of course, a straight draft. This design differs from either velveteens or corduroys in that there is no distinct ground weave. All the filling used goes to form a comparatively long pile, which is very securely lashed, since it interweaves plain with seven successive warp threads in each repeat.

The warp is cotton, and the filling woolen or worsted yarns, much heavier in count than the corresponding yarns generally used for velveteens or corduroys. The filling should be a softly-twisted yarn of fine wool chosen with due regard to its felting properties. After the cutting operation is performed, the pile is subjected to a teasing process which raises and separates the fibers composing the tufts. After this treatment, the fabric is felted until the small characteristic "cots" make their appearance all over the pile surface.

A form of cord or corduroy is occasionally produced which has the characteristic ribs of pile twilling at a more or less acute angle across the surface of the cloth; it is known as a diagonal cord or corduroy. The principle underlying its structure is, with one exception, identical with the ordinary variety in which the cords run parallel to the warp. The difference is that instead of binding all the pile picks on one or two groups of warp threads in each repeat of the weave, the stitching points are distributed over all the warp threads in a diagonal direction.

Chenille Axminster, or Patent Axminister as it is sometimes termed, is also a web pile structure, made to imitate, or rather to produce a very similar effect to, the warp pile fabrics known as Royal Axminister; both types of fabric are used extensively in the production of rugs and carpets. The manufacture of this type of texture is a difficult and complicated series of operations; as it involves characteristic processes totally different from anything employed in the making of fustians, such as velveteens and corduroys, it will not be discussed further in these paragraphs.

(*To be continued.*)

It is by presence of mind in untried emergencies that the native metal of a man is tested.—*Lowell.*

No man is too big to be courteous, but many men are too little.

The 1922 edition of the Official American Textile Directory—the Green Book—has just been issued and is being distributed. Two new features in this year's edition increase its convenience and further its value. One is an enlarged and elaborate "Table of Contents," which adds to the facility of the reader in finding any particular section or information in the directory. The other new feature is a new department called the "commission spinning, winding, weaving, etc.," department, which lists those mills which do spinning, winding, weaving, knitting, etc., on commission for the trade. In addition, the usual enlargement of the reports on mills has been made in keeping with developments in the industry, and about 400 new mills not in the previous edition are reported this year, and this edition also includes reports of changes in personnel, etc., that have taken place during the past year. The section containing the reports on mills contains the usual information, viz., the name of the company, names of officers, character of goods made, machinery equipment, etc., brought up-to-date. In addition the other departments which have been features of previous editions are incorporated in the present edition. The publishers are the Bragdon, Lord & Nagle Co., 334 Fourth Avenue, New York City.

The month of September will see a large concentration of meetings of chemical societies and associations of the chemical industry. The American Chemical Society, with its membership of 15,000 American chemists, will get together for its annual meeting in Pittsburgh on September 6th to 9th inclusive. The following week, September 11th to 16th, will be given over to the Eighth National Exposition of Chemical Industries at the Grand Central Palace in New York, while the American Electrochemical Society will meet in Montreal, Canada. In conjunction with the Chemical Exposition in New York, meetings of three other associations connected with the chemical industry will be held in the Grand Central Palace—the American Ceramic Society, the Salesmen's Association of the Chemical Industry, and the Technical Association of the Pulp and Paper Industry.

The National Aniline & Chemical Company, Inc., has recently issued its customary booklet of Dyer's Formulas for the Fall Season Card, issued by the Textile Color Card Association.

In the particular issue under notice, formulas are given for dyeings on skein silk under each one of the names established by the Textile Color Card Association, and following this a similar treatment is given the formulas for dyeing cotton. This, however, is divided into three methods. First, for light shades secured by direct dyes on cotton; second, medium and dark shades for direct dyes on cotton, and third, for basic dyes on cotton with tannic acid.

"The Bay Stater" is the name of an interesting and attractive little publication being issued by the Bay State Club of Wadsworth, Howland & Company, Inc., Boston. It is now in its first year of publication, and presents every appearance of careful preparation and work in its production. The July issue contains an article by George M. Cohan on "What the American Flag Has Done for Me" and other material of an interesting nature.

What the Southern Mills are Doing

Reports of increasing activity and continued new development and construction work among the southern mills were received during the month of July. A number of new mill projects were announced, and several mills partly finished indicated a decision to continue the work of construction and installation of machinery. Some of these mills were started during the war period, but construction operations were ceased and have been awaiting a sign of better conditions.

The temporary organization of the McLin Textile Corporation was perfected recently at a meeting held in Dalton, Ga., where the company proposes to build and operate a mill. A committee composed of C. E. McLin, of Rome, Ga., H. L. Smith, J. S. Hall, and W. C. Martin, of Dalton, and Ralph Walker, of Atlanta, was appointed to secure a site for the new mill and make application for a charter for the company. At the start it is planned to erect only a weaving mill, with 100 looms, the building to be 100 by 200 feet. It is proposed to first buy yarn and weave it into cloth. Mr. McLin, for many years general manager and treasurer of the Anchor Duck Mills, Rome, Ga., will be the general manager of the new mill. The company will have a capital stock of $150,000 and the mill will probably be built on the Lukens property, just outside the southern limits of the city of Dalton.

O. W. Bowen and W. W. Crews, of Jewell, Ga., have bought the White City Mills, Athens, Ga., from the Union Thread Co., Cincinnati, and will double the capacity of the plant. Improvements will be made under the direction of Mr. Bowen, and work has already begun on the expansion.

The Western Reserve Cotton Mills Georgia Co., Quitman, Ga., are reported considering the purchase of another textile plant in the South. The company now operates mills in Quitman and Millen, Ga.

Contract for 75 ready-cut houses to be occupied by employees of the new Hampshire Spinning Mills, Clover, S. C., has been placed. The houses are to be from three to six rooms each.

The name of the Union Bleaching and Finishing Company, Greenville, S. C., has been changed to The Union Bleachery. There will be no change in the management or policy of the concern, it is announced.

Announcement has been made that the plant of the Wateree Mills, at Camden, S. C., will be completely electrified, and that Lockwood, Greene & Co., Boston, Atlanta and Charlotte, are the engineers in charge of the work.

Plans are being prepared for the building of a new cloth storage warehouse for the Victor plant of the Victor-Monaghan Mills at Greer, S. C. A similar building will also be erected at the Seneca plant. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

The Southern Mills Corporation, Oxford, Ala., are planning on the expenditure of about $30,000 in new work at that plant. Among the improvements will be the erection of a large warehouse, the construction of a 225-foot mill extension, the erection of five cottages for employees. Otto Laetsch is the general manager.

The Lawrence Cotton Mills, Durham, N. C., have been acquired by the Stockton Commission Company, of New York, which operates mills in Eatonton, Ga., and elsewhere, and will manufacture fancy weave sports goods for women's skirts. Later it is planned to make silk and wool goods also. Frank W. Gurry, of the Stockton Commission Company will have supervision of the plant, which it is stated will begin operations on September 1. The management plans to begin with 7,000 spindles and 100 looms, but it is planned to later build an addition and add equipment to bring the total number of looms up to 225 with 12,000 spindles.

It is reported that the Dixie Cotton Mill Co., Mooresville, N. C., will add several thousand spindles to its plant. E. W. Brawley is the president.

An examination has just been made involving a comparison of the output of the Consolidated Textile Corporation mills in the South at the present time with the output of the same mills in October, 1920. The latter date was selected for purposes of comparison because it represents, generally speaking, the time when these mills came under Consolidated management. Production as measured in pounds of output per week shows an increase of 15.15 per cent for all southern mills. This result has been brought about in spite of the fact that in almost all cases finer yarns are now used, and a decrease instead of an increase of production might have been expected, but for the improvement in operating methods that have been introduced. In the nine southern divisions, as a whole, net waste has been reduced by about 40 per cent. The percentage of seconds has been cut down more than one-half.

Robert & Company, Atlanta, Ga., have been awarded the contract for the construction of the first unit of the Dixie Spinning Mills' million-dollar project at Chattanooga, Tenn. The proposed plans call for the erection of a number of such units. In addition to making plans and supervising mill development, Robert & Company have the contract for planning complete villages for the mill operatives, which will include water works, sewage systems, electric lights, schools, kindergartens, and community buildings.

The Standard Cotton Mills, Cedartown, Ga., have bought the Cook Duck Mill of the same place and will run this in conjunction with its own plant and will spin much of its own yarn into cloth.

The officers of the newly organized Hampshire Spinning Company of Clover, S. C., are as follows: Thomas McConnell, president; F. C. Johnson, vice-president; M. L. Smith, treasurer; Hugh McConnell, secretary; J. A. Pollard, assistant treasurer; John R. Hart, assistant secretary.

Directors of the Linford, Perfection and Acme Mills, Belmont, N. C., recently decided to purchase machinery for these mills and install it at once. The amount of the spindleage ordered for immediate delivery is as follows: Linford, 8,000; Perfection, 8,000; Acme, 5,000. It is expected to have this machinery in operation by the first of January. Directors of the China Grove Cotton Mill also gave orders for 8,000 spindles for that mill.

The Erlanger Cotton Mills Company, Lexington, N. C., have let contract for the building of a cloth room and storage warehouse, to be of standard mill construction, one-story, 230x70 feet.

A church building is to be constructed in the village of the Echota Cotton Mills, Calhoun, Ga.

A report comes from Lenoir, N. C., that a large bleaching and finishing plant is under consideration for Edgemont, N. C. It is said that some of the cotton mill men of the state are interested in the project. It is claimed that an unlimited supply of pure water is obtainable at Edgemont and that the streams will furnish all the power desired. Many mills in this section now send goods to the East for finishing.

Elk Cotton Mills, Dalton, Ga., will build an addition, 40x100 feet, two-story.

The Jenckes Spinning Company will move an appreciable amount of spinning machinery to its Loray Mills at Gastonia, N. C. Contract has been let to the Aberthaw Construction Company of Atlanta for a five-story mill to cost approximately $200,000, and this building will house approximately 40,000 spindles.

A post-office building is being erected by the Cannon Mills at Kannapolis, N. C., at a cost of around $30,000.

Additional machinery recently installed in the Delgado Mills, Wilmington, N. C., includes four intermediate roving frames, 10 fine frames and 20 spinning frames, bringing the total of spindles up to 23,040. This equipment was secured from the H. & B. American Machine Co.

The capacity of the Fort Prince Spinning Mill, Wellford, S. C., will be doubled, making the total number of spindles 12,000, and the plant will be changed into a cloth mill by the addition of looms and other equipment, it is announced, and the building will be considerably enlarged to provide for the expansion. Alfred Moore, of Tucupau, S. C., is the president. The mill will be known as Jackson Mill No. 2.

Wellman Cotton Mills Co., Athens, Ala., recently organized with $200,000 capital, are reported planning to enlarge the Fulton Cotton Mills, which they purchased, by the addition of 4,000 spindles and other equipment.

The Knoxville (Tenn.) Spinning Company have let contract for the construction of a two-story brick building to cost $31,000.

The New England Mill Situation.

The progress made in resuming work in the mills where strikes have been in effect since late in January has been steadier during the past month. In Rhode Island attempts have been partially successful in operating a portion of the Knight and Goddard properties and parts of other plants affected. In Massachusetts a strike was declared in the Merrimack mills of Lowell where a 20 per cent reduction went into effect after the Fourth of July holiday.

In Lawrence, it was stated that 50 per cent of the Pacific Print works operatives were either back or willing to go back as soon as places could be provided for them. Fully half the printing and bleaching plant was stated to be running. The Arlington plant was not opened formally but in some parts of the plant work was being done and the substantial stocks of worsted goods on hand when operations ceased early in the Spring have been disposed of. At Fitchburg the strike in the Parkhill mills has been broken. In some other Massachusetts centers where work was stopped after operatives refused to accept reductions, it is now certain that a slow resumption of work will begin as soon as the mills are re-opened.

In New Hampshire, after persistent efforts to bring about further conferences, the management let it be known that there could be no further compromise and the slow work of inducing operatives to return was continued. One large mill of the big plant now has more than half its working forces back and a beginning has been made toward resuming work in the worsted plant of the corporation. At Nashua the strike is being broken slowly and this is true of the Great Falls and Dover plants.

It will take many weeks yet before the effects of the strike have passed away and most manufacturers say they will not be able to run with a great degree of capacity before Labor Day.

No intimation has come out of Fall River or New Bedford of a purpose to reduce wages in those centers to the levels fought for elsewhere. There have been several meetings of manufacturers and the general opinion has been that until the outside strikes are finally ended it will be wise to continue under the present scale. Business has been better of late in New Bedford and Fall River and work has been more plentiful.

In Maine and Connecticut the mills are running on a 54-hour basis when they have work enough to warrant it. In both sections wage reductions have gone into effect pretty generally and have been accepted. The labor union leaders continue to claim that the strikes are effective and that the operatives eventually must win.

The attitude of many manufacturers has undergone a distinct change in the past two months as they have come to realize that an organized public sentiment against the cotton industry cannot be combatted by news propaganda. They are bending their energies to make their position more clearly understood by the people they employ. They have been showing less patience with the politicians, clergymen, and reformers who have held the center of the stage and giving more attention to the requests of business men in the various mill centers who cannot go on supporting a strike that was hopeless from its inception. These requests are not being made publicly nor in any organized form, but they are none the less effective.

The extent of the complication arising from tariff differences among New England manufacturers and its effect upon carrying out the business-like work of readjusting industry to meet market conditions has never been fully appreciated. As a consequence of the troubles of this year it will be a long time before New England manufacturers in textiles will again be a unit for high protection—the higher the better. Anger against the attitude of the woolen industry on the wage matter is especially deep.

Investigations made in the past month to determine what degree of likelihood there is of any part of the New England industry going South as a distinct removal of machinery show that there is little warrant to anticipate a happening of that sort. It is probably true that capital that might be available for further mill extensions in New England will seek southern investment. This will not involve a transfer of machinery in any case now known. If the capital investment is made it will be in new machinery and the most modern equipment, or the purchase of some property that may come on the market as the months go on.

The exhaustion of stocks of many standard staple cotton goods because of the strike has been of a most unusual character. Yet this exhaustion has not led buyers to offer the market price or above the market price for deliveries of such goods. The most liberal estimates show that not

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less than 300,000,000 yards of bleached muslins, ginghams, domets, and many other staple lines of goods have not been made since the first of the year. Despite this fact, instance after instance is cited in the market reports showing that goods of similar construction bring no higher prices than they did when the strikes began. In fact it is possible to get some lines of ginghams and domets at lower prices than those quoted six months ago.

Staple wide print cloths are now made at Fall River in such limited quantities that they no longer cut much market figure. The product consists very largely of odd widths and constructions of convertibles for a wide variety of uses. For this reason the reports from Fall River do not have the market meaning some traders give to them as indicating the actual movement of cloths that go into percales, 4-4 muslins, and many other staple lines. At Fall River the production has been increasing and there has been a substantial clean up of stocks of goods made from low priced cotton.

The finishing plants have been running light for three or four weeks. The job printers have not been able to do better than 60 per cent of capacity. The white goods bleacheries have been running about 55 per cent and the piece dyed works from 60 to 75 per cent.

The improved demand for fine goods began in the early part of June and has continued in small lots since. Sales of more than 100,000 pieces of 34-inch pongees have been made at prices running from 15¾ cents to 16½ cents. Sales of 100,000 pieces of slack and hard twist voiles were made in the first week of July for delivery through August and September. Lawns, silk and cotton goods, some poplins, and some shirtings were contracted for. The business on 60s-warp goods was larger than mills would accept for contract delivery at the price quoted. Owing to the steady inflow of small orders in the past month or six weeks fancy looms for fine goods are now comfortably sold ahead into the early Fall.

There is still a great deal of style uncertainty concerning the Spring goods, especially among the converters. The season end has seen a steady demand for ratines of all kinds both piece dyed and in fancy weaves. The tissues have gone out strong and mills that have shown advance lines of novelties for Spring have sold as many as they care to at this time. The mills that make the finer grades of swisses have many unfilled orders on their books and will carry considerable business into the new season. On the whole the revival of fine goods demand has been more promising than any other feature of the past month.

It is difficult for agents to see where the trade is going to get its fancy domets for Fall. The closing of the Nashua and Amoskeag plants took millions of yards of these goods out of the possible supply and stocks in second-hands are not large. The gingham outlook is better than it was a month ago largely in consequence of steadier sales among jobbers and retailers and not because of a demand upon the mills.

New England manufacturers are quite as much unsettled about cotton prospects as they were a month ago. They are beyond the stage where they fear any famine but they regard the speculative position as so strong that they will have to contend with high prices throughout the Summer and possibly into October, even if crop reports continue good. The carryover is so small and the demand for good grades of spinning cotton so steady that they are

prepared to be confronted with the alternative of paying very high prices for a time or closing their mills as the squeeze manifests itself.

Some of the mills have been very well supplied with cotton because they were not called on to use it as freely as southern mills whose looms were kept busy steadily. They are not well supplied with the long staples and are not disposed to pay asking prices for it until they actually have to buy. It has not been at all easy to pick up desirable lots and spot prices have been high.

Mills making sheets and pillow cases have had a steady business and are still comfortably taken care of with orders through July and August. Manufacturers of these goods have contended that prices should be higher and based upon the conditions of a year ago with cotton 10 cents a pound cheaper and quoted prices for wide goods the same as today, their position may seem strong. Buyers do not look at it that way and have found it easy to get goods as they needed them.

Reports from machine shops show that there is ample business in sight for them principally with southern enterprises. From all that is learned at the shops it is coming to be a question of delivery more than of price with many new concerns that are being organized in the spinning and weaving lines.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, July 15, 1922.

The cotton market bulged to the highest levels of the season as result of returns to the government, as of June 25th, indicating a crop of only 11,065,000 bales. Since the Bureau report was issued, July 3rd, an easier trend of values reflected more favorable weather conditions in the cotton region but the crop does not seem to be making the improvement anticipated owing to damage by weevil.

According to the Giles Bureau, their returns, average date July 9th, average the condition of the plant at only 71.6 vs. 70.9 two weeks previous, pointing to a yield of 11,190,000 bales. An improvement of only seven-tenths of one point is a poor showing considering the exceptionally favorable climatic conditions prevailing during the period.

The crop is now entering the stage when natural deterioration takes place, and as weevils are more numerous and earlier than ever known before, the crop outlook is not at all encouraging. The weevils generally do the greatest damage during August when squares and blooms become general, on which the weevils feed.

On July 3rd the government estimated the increase in acreage at 10 per cent, or 34,852,000 acres vs. 31,678,000 last year.

Advices from Washington are to the effect that publication in the August cotton report of the Department of Agriculture of information on the abandonment of cotton acreage up to July 1st is required under a resolution by Senator Heflin, Democrat, Alabama, adopted by the Senate. The resolution recited that the boll weevil and other causes had resulted in abandonment of much cotton acreage, and the acreage statement is called for next month, August 1st, instead of next December as usual in the past.

Spinners have drawn so heavily on American supplies of raw cotton that last year's crop of about 8,400,000 bales, including linters, has long since passed through the spindles, and in addition heavy inroads have been made on old reserves in America, to the extent that mills of the world have taken thus far this season about 12,350,000 bales, with prospects for accepting about 12,750,000 bales for the whole season vs. 10,500,000 for the whole of last season.

Census returns show that mills of the United States consumed 508,000 bales of lint cotton during June vs. 462,000 for corresponding month last year, making it possible for American mills to consume of American cotton this season about 6,100,000 bales against 5,183,000 last season, linters included.

Prospects are that the world's carry-over at the close of this season, of American cotton, will be about 5,000,000 bales compared with 9,194,000 last season. However, year-end corrections may change these deductions, perhaps to a considerable extent, with chances of the carry-over being smaller than now indicated. It is apparent, therefore, that the trade will have to depend almost entirely on the new crop for next season's requirements, and unless the growing crop improves materially and gives assurance of a much larger yield than now indicated, there is little prospect of values declining very much, whereas if the crop does not improve, there is the possibility of prices working much higher eventually, as the trade in all probability will need at least 13,000,000 bales for next season.

As is reflected in the larger consumption in America last month, the textile strike is all but broken in New England, as advices from Providence state that 60 to 70 per cent of the operatives have returned to work in Rhode Island where some mills are running to full capacity.

Aside from the rail and coal strikes, which may be settled shortly, the textile industry seems to be in good shape the world over.

"Getting the World to Work" is the title of the latest book of Sir Charles W. Macara, Bart., which has just been published. This book consists of a compilation of a number of articles prepared for the press by Sir Charles during recent months which deal with national and international questions arising during the reconstruction period following the war. Some of the chapters give the viewpoints of the writer on questions affecting the better conduct of the cotton industry and the best means of promoting the revival of trade on a world-wide scale—and in addition important questions such as disarmament, the necessity for internationalism in industry, and other subjects related to the progress and welfare of the industrial world have been ably covered in the chapters of this book, and Sir Charles has written in his usual interesting style, while his remarks are made instructive as well by his extended and close association with industry, his observant and analytical mind and his keen foresight regarding the future prospects for the industrial world. The book is published by Sherrat & Hughes, 34 Cross St., Manchester, England.

The offices of the J. D. Collins Sales & Engineering Company have been moved to 55½ Luckie Street, Atlanta. They formerly were located at 927 Grant Building. This organization represents as southern agents a number of lines of mill supplies and equipment.

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Notes About Men You Know.

W. H. TISDALE has been appointed superintendent of Couch Mills, Inc., East Point, Ga.

ROBERT TONEY has resigned as overseer of carding at the Scottdale Mills, Scottdale, Ga.

E. T. SWORDS has resigned as overseer of twisting at the Bibb Manufacturing Co., Columbus, Ga.

J. T. HUNT is again overseer of carding at the Unity Spinning Mills, LaGrange, Ga. He has recently been in Macon with the Bibb Manufacturing Co.

J. P. ELLER has resigned as overseer of weaving at the Alta Vista (Va.) Cotton Mills.

J. S. STROUD has become overseer of carding at the Darlington (S. C.) Mfg. Co. He was formerly at the Loray Mills, Gastonia, N. C., in a similar position, and at Darlington succeeds M. A. Crolley.

J. A. RUDISILL, overseer of spinning and carding at the Selma (Ala.) Manufacturing Co., has resigned.

W. D. ELLIS was recently promoted to the position of assistant superintendent at the Valley Waste Mills, LaGrange, Ga.

H. L. MORGAN has succeeded J. A. Rudisill as overseer of carding and spinning at the Selma (Ala.) Manufacturing Co.

C. H. GOODROE, formerly superintendent of the Magnolia Textile Corporation, Moorhead, Miss., has recently become superintendent at the Standard Mills, Monroe, N. C. H. L. Dearman will have charge of the carding at the Standard Mills, with J. W. Stafford as spinner and L. W. Kirkman as weaver.

REGINALD POPE is now representing the A. E. Staley Manufacturing Co., Decatur, Ill., manufacturers of starches and corn syrup. He is associated with his father, J. W. Pope, southern representative, and, with the Ansley Hotel, Atlanta, Ga., as headquarters, is traveling Georgia, Alabama, Mississippi, Texas and Tennessee.

H. L. JAY has been made superintendent of the mill of the Hamilton Carhartt Mills, at Elberton, Ga., succeeding E. W. Edwards, resigned.

M. T. POOVEY has resigned as superintendent of the Gastonia Cotton Yarn Co., Gastonia, N. C.

O. L. YARBORO was recently promoted to overseer of spinning at the Lockmore Mills, York, S. C.

J. H. JACUMEN has been promoted to superintendent of the Broad River Mill, Blacksburg, S. C.

C. F. RUSH has been made spinning overseer at the Winnsboro (S. C.) Mills. He was formerly at the Hartsville (S. C.) Mills in a similar position.

CHARLES CROMPTON, eldest son of the late George Crompton, founder of the fancy loom business in this country and grandson of William Crompton, one of the pioneer loom inventors of England and America, died July 5, at his home in Worcester, Mass. His grandfather invented the fancy power loom in 1837, and all looms today, both in America and Europe, which weave fancy fabrics, with exception of those woven by jacquards, use this invention of William Crompton. His father, the late George Crompton, built the first broad fancy looms, which quadrupled the production hitherto possible. Mr. Crompton was himself responsible for the development of colored automatic weaving wherein a multiple of shuttles are used. Up to the time of this pioneer invention, automatic weaving was confined to single shuttle work. By the adoption of his invention as many as six colors may be used to automatically weave checked ginghams, worsteds, woolens and silk fabrics. Mr. Crompton was president of the Crompton Loom Works at the time of the consolidation of the Crompton & Knowles Looms Works, the largest builders of fancy looms in the world. He then held the position of vice-president of the Crompton & Knowles Loom Works for a number of years.

JAMES HENDERSON has accepted the position of weaving overseer at the Gainesville (Ga.) Cotton Mills.

J. T. KNIGHT has resigned as assistant superintendent of the Prendergast Cotton Mills, Prendergast, Tenn., and returned to his former position as overseer of carding at the Park Yarn Mills, Kings Mountain, N. C.

F. H. TRUITT has been elected a director of the Hillside Cotton Mills, LaGrange, Ga., to succeed J. W. Lane, of New York, resigned.

JAMES A. PAGE has been elected president of the Ruby Mills, Gastonia, N. C.

NELSON A. BATCHELDER was re-elected president of the Southern New England Textile Association at its annual meeting on July 5th in the New Biltmore Hotel, Providence, R. I. F. W. Steele was chosen vice-president, and W. S. Pepperell, secretary. New members of the executive committee were elected as follows: Jesse Knight, Herbert Rice, W. C. Murphy, Ezra Dixon, Louis Kurr, John Palmer, Benjamin C. Chace, and Fred Howe. There were 180 members in attendance at the meeting.

An attractive folder has been issued by the Textile Accessory Division of the Gallaudet Aircraft Corporation, East Greenwich, R. I., on "Featherboard as an Advertising Asset," which shows a number of pleasing labels made for use on these reels. Among the advantages advanced for putting up goods for the counter on these featherboards is that provision can be made so that the label, in addition to being a silent salesman, can carry the re-order number, price and yardage records on it. This is pointed out as a distinct advantage over the old plan whereby a larger tag was suspended from the wrapping board by a string, frequently becoming detached and lost. These featherboards are made of selected kiln-dried lumber and Kraft paper, and constitute a framework covered tightly, forming a hollow drumlike structure that resembles, in its fastenings, the wing of an aeroplane. They are made in all lengths and widths, and in half-inch and one inch thicknesses.

The Atlanta office of the Monroe Calculating Machine Company has been moved to 55½ Luckie Street, Atlanta, when, the company announces, it became necessary to move into larger quarters to take care of increased business and to look after the wants of Monroe users. E. B. Ray is the sales agent for the company in the Atlanta office.

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Indigo

BY WILLIAM B. NANSON.

Indigo may be discharged either by the oxidizing or reducing processes, but the oxidizing method is the one most generally used; the reducing process produces good results but is more difficult to handle owing to the premature reoxidation of the reduced indigo, as I shall explain more fully under the head of discharging by reduction.

The oxidizing agents used convert the indigo into isatin, which is dissolved out leaving a white pattern wherever the cloth was printed. The discharges principally used are the chromate, the prussiate, the nitrate and the chlorate. Each may be said to possess special advantages under certain conditions, but the first—the chromate—is found to be the most generally useful, and finds the most extensive application.

By this chromate process the indigo-dyed cloth, printed with a pattern paste made from a chromate, is passed through a hot bath of sulphuric acid. This liberates the chromic acid in the chromate and destroys the indigo where it is printed upon it. There is danger, however, that the cloth may be tendered, especially if any excess of chromate be used in the discharge paste. Even under the most favorable conditions, there is always some tendering of the cloth as it is next to impossible to gauge the exact quantity or strength of chromate to discharge varying shades of blue, and if the chromate is too weak the blue will not be fully discharged and the white will be poor, therefore an excess of chromate seems indispensable to insure a clear white. This tendering may be hindered to some extent by adding reducing agents to the sulphuric acid bath—glucose, brown sugar, dextrin and glycerin have been tried in this connection, but the writer has little faith in them. Oxalic acid is probably the best thing to use to counteract the oxidizing action of the chromic acid. It regulates the discharging to some extent and at the same time it renders the excess of chromic acid in the bath less active by reason of its reducing properties. It is certain that as the chromic acid in the bath gets stronger it might in time become sufficiently concentrated to discharge the color on the unprinted parts of the cloth. I have seen light color indigos where the color was partially destroyed over the whole surface of the cloth by an excess of chromic acid in the "souring" or "cutting" liquor.

The main advantage of the chromate discharge is that it allows of bright and fast color effects being printed on an indigo blue ground of any depth. The pigment colors—chrome orange, chrome yellow, Guignet's green, sienna, vermilion, lamp black, yellow ochre and various lakes and Prussian blue—are used for this purpose. They are fixed with albumen which becomes coagulated and insoluble during the run through the acid cutting bath. Steaming is not necessary.

For a white pattern only on the indigo ground, the bichromates of potash or soda may be used; they are simply dissolved in water and added to starch paste or British gum thickening. For the pigment colors, however, the bichromates must be neutralized with an alkali—caustic soda, soda ash or ammonia, otherwise the acidity of the bichromates would coagulate the albumen before the color was printed. An excess of ammonia does no harm except to Prussian blue; and a slight excess of soda is even permissible in the case of chrome yellows, and the various oxides of iron. A little free alkali improves the working qualities of pastes containing albumen, but care must be taken not to add too much or coagulation may be hindered.

Great care must be taken with the grinding and straining of all pigment colors if good results are to be secured.

Pigment colors and other insoluble substances are usually ground up in a mill with their respective thickenings, the chromate or soluble additions being made afterwards; or they are added to their pastes in the form of finely ground mixtures (with water, etc.) of a creamy consistency. Both methods are used, but the former is more reliable and is always employed in a works furnished with the necessary grinding mills.

A brush furnishing roller must be used, and turpentine or some other suitable agent to prevent the color from frothing. The quantity of bichromate to be used in the printing paste depends upon the shade of indigo to be discharged, and upon the depth of the engraving. Colored discharges require less than white discharges, as the pigment covers the slight undertint of blue.

The following examples of chromate discharges are taken from actual practice:

WHITE.

810 parts British gum paste
160 parts bichromate of soda
30 parts turpentine.

The British gum paste is made as follows:

350 parts British gum
650 parts water.

YELLOW.

320 parts chrome yellow
60 parts gum tragacanth thickening (6%)
20 parts rape seed oil
20 parts turpentine
300 parts 40 per cent albumen solution.

Grind together and add

120 parts bichromate of soda
100 parts caustic soda, 70 degrees Tw.
60 parts water.

The 6 per cent gum tragacanth thickening is made as follows: 600 parts gum tragacanth and 9,400 parts cold water. Allow to soak from 24 to 30 hours, then boil until smooth. The 40 per cent albumen solution is made as follows: 800 parts albumen and 1,000 parts cold water. Dissolve cold. Blood albumen is usually used for a 40 per cent solution and egg albumen where a 50 per cent solution is called for.

BROWN.

250 parts burnt sienna paste
100 parts 6 per cent tragacanth thickening
300 parts 40 per cent albumen.

Grind and add

120 parts bichromate of soda
100 parts caustic soda, 70 degrees Tw.
90 parts water
40 parts rape seed oil.

(*Continued on page* 811.)

An Old Timer Says

I had heard many complimentary remarks about this mill where my friend is superintendent. In fact, he is considered one of the best manufacturers in these parts. Therefore, I naturally looked forward with much pleasure to visiting his mill.

I breezed in on him one afternoon not long since and found him in his usual good humor. We sat in his office and chatted for a while about old times, how the mill business had progressed, how machinery had improved, how old we were, etc. He told me that his mill was running like a house afire; his production was certainly fine judging from the reports he let me look over, and his cost was nothing to be ashamed of.

Finally, he suggested we take a look through the mill, and on our way from the office, he said, "Well, Old Timer, you know I consider you a personal friend, and I want you to 'cut loose' when we get in the mill and give me all the criticism you can." I promised faithfully to speak right out and tell him anything that I thought would be of service to him in any way. After seeing his good reports and having heard so much of his success I suppose I was a little too anxious to find something to criticize. At any rate, I will relate a part of our conversation so you can judge for your self.

The cloth room was the first place we came to, and we started our inspection in that department. We stopped at the stitchers and after a minute or so my friend started on, but I said, "Hold on, Mr. Superintendent, here is one little thing I want to call your attention to. Don't you see those stitcher boys are letting the cloth extend too far over the hooks which hold the two pieces of cloth together to be stitched?" I took hold of a piece of cloth as the roll in the stitcher ran out and placed it on the hooks within about ½ inch of the end of the cloth. The boys had been hooking the cloth about 1½ inches from the end. One inch of cloth saved on each end of each cut, we soon figured out, would soon run up into a saving of many yards.

"But," says my friend, "we do not tear that off. We let it go right on through." About that time I touched him on the arm to show him a folder man tearing the cloth in two on each side of the stitched place. He explained that the folder man had only been there a day or two and he would have the overseer instruct him right away.

I also explained that even if he did let this stitched place stay on the end of his cloth and received no complaint from his customers, there was much less likelihood of a complaint when the stitched place was only ½ inch from the end, than when it was 1½ inches from the end because it had to be torn off by somebody before the cloth went on the counter.

We started to walk on by the brushers but I said, "Hold on, don't go so fast. Suppose we look into one of these brushers." He stopped the machine and began to blow the dust off the top so we could see the doors. About that time the overseer walked up and having known him also for a number of years, I said, "John, if you will tack a piece of stiff cloth (preferably duck) to the cover or housing there just above your shearer blades where the cloth passes over the first iron rod it will close up that space and your brusher will not throw out nearly so much dust. Let the piece of stiff cloth rest gently against the moving cloth and that will cut off the draft."

By that time my friend, the superintendent, had the brusher stopped and was taking the housing or covering off so we could see the different rollers. His emery rollers had no emery on them at all, but the overseer explained that those rolls were wrapped with heavy cord and the emery cemented onto the cords. He had tried to put emery on them that way but it would not stay on.

I told him I had seen rolls covered spirally with emery fillet like a drum grinder on cards, but to be sure to order very coarse emery to cover the brusher rolls with as the regular emery fillet for grinding cards was not coarse enough. Even if they were covered with regular card emery they would do better work than not having any on them at all.

His shearer blades were sharp on one side so he said he would turn them around right away, and didn't know why he hadn't done that sooner, but just hadn't noticed them lately. My superintendent friend looked at him and frowned, but I did not see it and passed on to the carding rolls. These are the rolls covered with fillet somewhat resembling burnishing fillet for a card. Like the shearer blades, they were dull—in fact they were as slick and smooth as glass. "Have you ever re-covered these rolls?" I asked. No, they had not, in fact, the overseer said, he didn't think they needed it then.

"Well, suppose you go get me a good, sharp flat file, the largest one you can find," I suggested. Then we took the cloth out of the machine, started it up and held the file against the wire fillet all the way across the roll. After going over the roll with the file several times, I suggested that we clean off the other roll, but not sharpen it, and run several rolls of cloth through to see if the sharp roll picked up any more strings than the dull roller. I do not think it necessary to relate to any superintendent or overseer the result of our inspection about one hour later.

Most any card clothing manufacturer will sell you fillet for these rollers, I told them, or you can get it from

(*Continued on page* 803.)

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How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishng plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Long and Short Card Drafts.

EDITOR COTTON:

In glancing over some of the remarks in the "How Other Men Manage" columns of COTTON I feel that a few additional remarks are not out of place.

If increasing the draft on a card is of advantage, why stop at a mere 200? The fact that present gearing will not allow us to use such drafts is a poor objection and can be easily remedied provided there are any advantages.

The same theory can be applied to any machine. I have spun 20s yarn from 1 hank slubber roving single, with a draft of 20 and in this particular case it was woven into cloth and sold, passing all tests and specifications. But that case is peculiar unto itself. I would not advise its use in all cases nor would I say that it was a high grade yarn.

I cannot understand how any one can say that such and such drafts and speeds are the best for all classes of work. Neither can I understand how anyone can say that three processes of picking are better than two, or that three processes of drawing are better than two, or vice versa.

Everything in a cotton mill is relative. Mill work is a series of many distinct, separate operations and changes in one must be considered in relation to the effect on the others and finally its effect on the character and quality of the goods produced.

But if a steel knife is all right and will do all that a knife should do and prove satisfactory why make one of solid gold? Even so-called solid silver knives have steel blades, because a solid silver blade would be of no use and would not cut. Yet such a knife would be more valuable as far as money goes and would doubtless prove more satisfying to so-called fastidious tastes.

In the manufacture of cotton sheetings the yarns used are known as carded yarns. They satisfy the conditions imposed upon such a fabric and, if made right, the fabric cannot be improved upon, considering its utility, by the use of combed yarns.

I think that in the majority of cases I am perfectly safe in saying that the cotton fiber is never any stronger than at the moment of its full ripening in the boll. All succeeding operations from picking to the finishing of the cloth tend to take some of the strength from the fiber. The more it is worked and the harsher the treatment it receives, the weaker the fiber.

It has been generally proven also, that the faster the stock can be passed through the pickers and cards and still give it the working required the less the fiber will be injured.

The longer the draft the longer the fiber is retained between the feed and delivery rolls and the more it is worked. In the picker the blows per inch are increased and in the card the stock is held longer at the feed plate for the action of the licker-in. Long drafts on cards do not increase the work of any part of the card except to hold the fibers at the feed rolls a longer time.

A certain weight sliver must be produced whether short or long drafts are used and for a certain time the weight of stock passing through the card will be the same for either short or long drafts.

Another thing I cannot understand is why it should be necessary, for the running of long drafts on the cards, to have a more even lap than with short drafts. I believe that a licker-in can snatch in on short drafts just as much as on long drafts if the laps are equally uneven.

As far as the speed of the feed goes, there has got to be just as many fibers carried into the card to produce 10 pounds of 50 grain sliver per hour from a 10-ounce lap as from an 18-ounce lap. And I have always been able to produce an 18-ounce lap that would be more even than a 10-ounce lap would be even. I have found that the heavier the lap the easier it is to keep it even.

An incident in which the writer took part in an advisory capacity may be of interest.

A certain mill found that if they could make cotton sheeting at a certain price they could get some business. At the price that they had to sell at, they found that they would have to lower the grade of the raw stock. They accordingly went ahead and did this.

When this stock reached the looms they found that, due to an excessive breakage of warp, they were unable to weave within the estimate made. They were using 28s warp made from 1-inch stock. The break on this yarn was about 8 to 10 pounds under the standard.

Here is what we did: First, we cut the speed of the beaters on the pickers from 1,500 r.p.m. on the two bladed type to 1,000 r.p.m., and the three-bladed beaters to 675 r.p.m. They used three processes of picking with a breaker having a three-bladed beater in the opener section and a two-bladed beater in the breaker picker proper. This change increased the breaking strength on the warp from 50 to 56 which was still about 4 pounds below the standard.

But the yarn was not as clean as it had formerly been. So to overcome this fault we decided to make a heavier

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lap on the finisher picker and increase the draft on the card, holding the stock longer at the licker-in and getting the benefit of the extra cleaning. We produced a cleaner yarn and held our breaking strength but we were not satisfied.

About this time they changed the type of the cotton being run. Same staple and grade but bought of a different dealer. When this began to come through into the spinning room it was found that the break was running around 58 and 59. We had been so successful in increasing breaking strength, that, with the idea of cutting labor costs to rock bottom, it was decided to try to eliminate the intermediate picker.

To do this it was decided to reduce the fan speeds on the breaker and finisher slightly and also reset the grids.

Then we cut out the intermediate pickers, took three men off the picker room pay roll and our break jumped to 62 pounds, which was so good that the looms began to weave more efficiently and about 6 weeks later the boss spinner was catching "hail columbia" because looms were waiting for filling.

Now there is a case where reduced beater speeds, elimination of one process of picking, increased card drafts and proper settings made the difference between that mill making or losing money. But it is a condition that might not exist in another mill and the same change under other conditions would not give the same results.

All things must be considered in relation to the rest of the process.

I don't think that because a yarn is cleaner that it is necessarily stronger. I don't believe that holding stock at the licker-in to clean it will produce a stronger yarn because it is cleaner.

I have spent some time trying to catch one of those "small particles of dirt" that "Tom" mentions as causing the spinning rolls to jump, right in the act. But so far, my efforts have not been crowned with success. But I will say that with the aid of a magnifying glass I have seen particles of dirt pull out of the flutes in the bottom roll. I believe that rather than make the rolls jump such particles of dirt are forced into the flutes or if they do ride on the top of a flute that the leather roll gives before it will jump. Of course, if we get slugs or pills or other foreign matter that will not pull out of the flutes, then we may get a jumping top roll. But any small particle of seed and leaf, such as would be found in spun yarn to the extent of making that yarn specky, I have yet to see them make a top roll jump.

Before winding up these few remarks I wish "Wash" would state that law of compensation that he tells us about, so that we could all look out and not get caught.

And that reminds me that "Wash" has told about twist escaping from the roving at the presser paddle. I wish he would explain this twist and tell how it escapes and where it goes to.

S. A. F. (R. I.)

Users of bulk materials such as coal, sand, gravel, cement and crushed stone often find it necessary in emergencies to store and reclaim large quantities, at a low expense. In this connection, a recent booklet issued by the Link-Belt Company, describing their power hoe or improved drag scraper is of interest. The booklet shows views of installations of this equipment, demonstrating the many uses to which it may be adapted.

Preventing Labor Turnover.

EDITOR COTTON:

There is much talk among mill men at the present time about labor turnover, the causes and remedy. The questions frequently are asked, "What percentage of new help stay with you?," and "Why do they leave; is it bad hiring on the part of the overseer?" Right here I want to express my opinion concerning employment managers. I have been an overseer for several years, and I don't want anyone hiring my help for me—regardless of who he is or where he comes from, and I believe that most overseers, especially the old-timers, will agree that a man wants to talk to his help before hiring them.

The overseer, in hiring new workers, should explain fully the requirements of his mill as regards bad work, cleaning and the like, for it has been the custom during the past few years with some men to let most anything go by especially as to cleaning. And then when the new hand comes in to the room, the section man can play a very important part in getting results from him. If the section man puts him on a job and says in a hard-boiled manner, "You run this job and remember we don't stand for any bad work; if you make any you will get fired"—if he does that the hand is dissatisfied before he starts in to work. But, on the other hand, if the fixer says, "Now you must be very careful about bad work, and don't let anything get by except perfect roving or cloth, as every time you make a piece of imperfect work you cause waste and loss of production," the worker will be satisfied and respond. The fixer should also tell him that if he does not fully understand that particular class of work that all he has to do is to let him know and he will help him get straightened out and going.

Now I don't mean by this that a section man should undertake to run his helps' work for them, for he has plenty to do himself, but he can offer suggestions that will help more than manual labor. He is supposed to be a better speeder tender or weaver than the other fellow, else he would not have the position he has, therefore he can help with instruction. Another thing: an overseer should not put on a new hand and then forget he is there. He should get acquainted with him and make him feel that he is welcome to the city, that he is one of the bunch. And he shouldn't wait too long to do it, either; get him satisfied the first day and he will be back next morning bright and early and ready to work.

And the overseer himself has a big part to play right along this line. It has never cost anyone more than a million dollars to nod his head, smile and say good morning to a new worker. And I do know by experience that the fellow who can smile and speak to his help, even on blue Monday, generally has enough help to start all his machines on that same blue Monday. The fellow who can't remember back before he became overseer and put himself in the other fellow's place has a very short memory; when he goes around with a frown on and a look that would make sour apples seem sweet in comparison, if there is anyone short of help he is invariably the goat.

Now don't get the idea that I am an advocate of laxity, for I am not—far from it. But I am in favor of a strict discipline carried out in a gentlemanly way; in other words, treating the other fellow like you would like

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for him to treat you if your positions were reversed, going to him in the same manner that you would want your overseer or superintendent to come to you. Then quality and quantity will pick up on all the machines operated by red-blooded American men and women. When a fellow is found who can't be approached in that way he should be tried a few times, but the overseer shouldn't wait until he has done too much damage before settling up with him and letting him go to make room for someone who will appreciate good treatment.

I was visiting a friend of mine once and while we were sitting in his office a man came in to apply for work for himself and his daughters who were spinners. My friend asked him where he was from and he named a nearby mill. My friend replied that they paid more for spinning there than he did and also had better living conditions and asked why he wanted to change. The applicant replied that he knew they could make more where they were but, to use his own words, "You have a gentleman for a boss spinner and I had rather my girls would work for him for less money." To my personal knowledge, the spinner at this mill was much stricter than the one he was leaving, for he was death on cleaning up and good work, but he made the work run good and "bossed" his help in a nice, firm way. He has been overseer quite a while but he has never forgotten that once he swept and doffed. Therefore, he can put himself on the other side of the fence. Mike (Ga.)

There are men who labor under the delusion that if they should hide their light under a bushel, the whole world would be dark.

A Grinding Rig for Neb Bars.

EDITOR COTTON:

Up to the last few years machinery builders did not dress the ends of the neb bars on the spinning frames, so that if the bars are examined closely the ends will be found very rough and uneven. The bars in many instances will have small burrs projecting out on the ends as shown at A in Fig. 1. This does not allow the adjustment of the tips all to the same place and as a consequence the top leather rolls will not be in line with the steel roll.

Where this condition exists it is impossible to get the best results from spinning. In my report as Chairman of the Spinners' Committee at the Wrightsville Beach meeting of the Southern Textile Association in June, I referred to a machine, that can be constructed at a very small cost, which enables a mill man to grind off the ends of these bars quickly and economically and many men by so doing have materially improved the running of their spinning. Having been requested for an illustrated description of this device I am passing it along herewith to your readers.

Often the neb bar tips are also left rough and very often a small burr can be found in the corner as shown at B, Fig. 1. This can be overcome by filing out these corners with a flat file. On some makes of spinning machinery, especially on the older models, the bar and stands are so constructed that the end of the top roll is down below the face of the bar as shown by the dotted circle at A, Fig. 3. This makes roll picking a very hard job, and where this is found it has been my experience that there usually are dirty rolls, and every spinner knows that

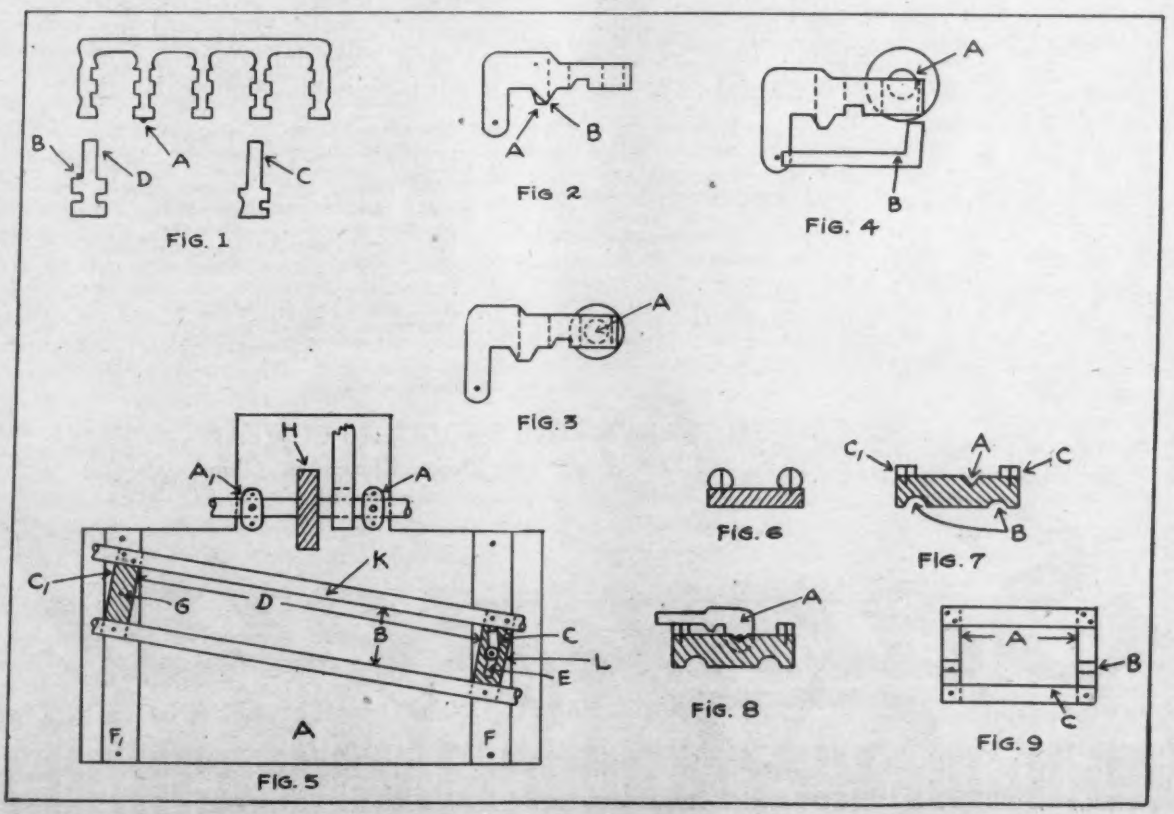
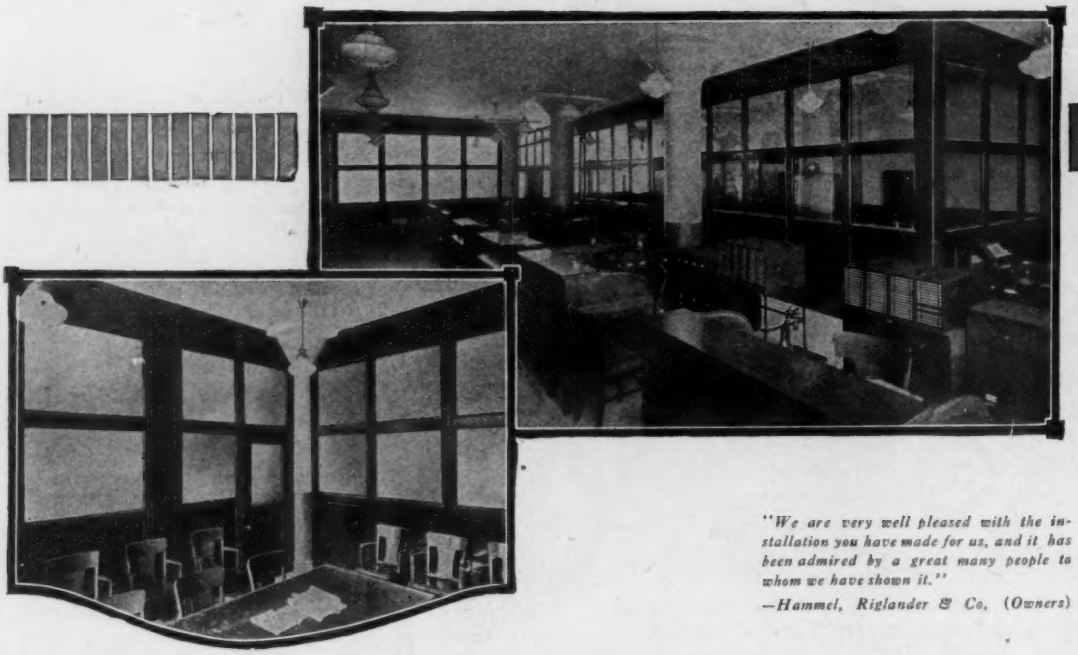


FIG. 1 FIG. 2 FIG. 4 FIG. 3 FIG. 6 FIG. 7 FIG. 8 FIG. 9 FIG. 5



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clean rolls are absolutely essential to good running work.

This difficulty can be overcome by taking the bars out and filing the neb bar shoulder as shown at A, Fig. 2, down the line as shown by arrow at B, so that this shoulder will project over the shoulder of the back stand. Then by filing down on the corners of the front shoulder of the stand where the outside tip arm (C, Fig. 1) rests, the bar can be let down and the end of the roll made to project over the face of the bar as much as desired, as shown at A, Fig. 4. This will make the picking of rolls a very easy matter. In some cases where this is done the middle tip arms, D, Fig. 1, are so thick that when the bar is let down they will strike the steel roll. This can be remedied by dressing the arms down with a file.

It will readily be seen by observing Figs. 5, 6 and 7 that the construction of the machine for milling off the ends of the bars is very simple, and I will give more descriptive measurements than actual measurements in my explanation:

First, build a table, A, Fig. 5, about five times the length of the bars to be worked, and about 18 inches wide, with an offset at the back sufficiently large to take care of the emery wheel rigging, etc. Fit an 8x1½-inch emery wheel and driving pulley on a short piece of shafting of any convenient size. Then fasten this to the table with two plain flat rigid bearings, A and A_1, so that the emery wheel H will extend over on the main part of the table about half its diameter as shown.

Next make an adjustable slide by taking two pieces of 1½-inch steel rod, B, Fig. 5, about 3¼ times the length of the bars. Mill off ¼ of the diameter of the rods making the bottom side flat. Bolt these rods at each end to blocks six inches long by two inches wide and half an inch thick, as shown at C and C_1. One rod should have two bolts in each end in order to hold the slide square. The distance from outside to outside of the rods to be 6 inches and the length, D, to be fully three times the length of the neb bar. An end view of the slide is shown at Fig. 6.

Drill a slot in the block on the right end as shown at E, Fig. 5, for adjusting. Next bolt two pieces of sheet iron, two inches wide, across the table as at F and F_1, Fig. 5. Then bolt the slide to one of these at the left end with a single bolt as shown at G, Fig. 5. On the right-hand end, where the slot is, use a stud with a thumb nut so adjustments can be made. The slide should be fastened to the table at G so that when stud L is a little better than half way to the front of the edjusting slot the front rod K is about 1¼ inches from the face of the emery wheel.

The carriage which runs on the two bars for a track and holds the neb bars in place for grinding is made by taking two metal blocks seven inches long by 1½ inches square. Drill these at the bottom to fit the track as shown at B, Fig. 7, and on the top, cut a slot three inches from the face of the carriage for the neb bar pin as at A, Fig. 7, so that when the neb bar is placed on the carriage with the pins in the slot the ends of the bars will extend over the front of the carriage about ½ inch.

A top view of the carriage is shown at Fig. 9. The two blocks are fastened together by two strips of sheet iron ¾ of an inch wide, as shown at C and C_1, Fig. 7, and C, Fig. 9, of the right length to make the distance A, Fig. 9, the exact length of the bar in order that when the bar is placed on the carriage, the bar pins will fit in the slots B, and hold the bar steady and in line for grinding.

The thickness of these strips does not matter except on the front of the carriage. As the bar lies across this strip it must be thick enough to hold the bar level. In case two lengths of bars are used, the only change necessary to make the carriage fit the bar is to have an extra pair of strips the right length to fasten on the carriage blocks. Fig. 8 shows an end view of the carriage with neb bar A in place for grinding.

It has been found that by setting the carriage at an angle to the emery wheel, as shown, that it will take hold better.

Place the carriage on the track and place the bar on the carriage. Then set up the slide to about the right place and tighten down on the thumb nut to hold in position. Hold the bar down firmly with the hand and pass the carriage by the emery wheel. Adjust the slide until the desired amount is being taken off the ends of the bars, which can be determined by placing the bar back in the spinning frame and putting in a new set of top rolls. After getting one bar right, make a gauge the exact length from the bar pin to the end of the bar as shown at B in Fig. 4, in order to gauge them occasionally and adjust for any wear on the emery wheel.

If this work is properly done an improvement in the running of the spinning will be certain to result. If any further information concerning it is desired by COTTON'S readers, I shall be glad to furnish it.

Carl R. Harris (S. C.)

Neps in Yarn.

EDITOR COTTON:

In replying to the question of "C. S. H. (Texas)" in the June number on what is causing the neps in his yarn, I should believe, from what he has to say, that his trouble is in the picker room. He does not state whether he is using an ordinary picking process or one of the various patented cleaners in his picker room. The reason I mention this is that a number of mills running this low grade, dirty cotton are using these cleaners, and some of them are getting neps therefrom, but we will assume that he is using the ordinary processes.

First, I would look in the picker room for the trouble, and would suggest that he set his beaters as follows: breakers, ⅜ inch; intermediates, 5/16 inch; and finishers with Kirschner beaters, ¼ inch. And if possible, he should reduce the weight of his lap. If he can't do this, he certainly should not set his tops to a 5 gauge, as he indicates he is doing. My suggestion would be: a 12-ounce lap *at the most*, with the settings given, and the cards set as follows: Feed plate to licker-in (for this short, dirty cotton), 12 gauge; mote knives top, 12, bottom, 10; back plate bottom edge, 22, top, 17; top flats, 10; licker-in to cylinder, 7; doffer, 7; bottom front plate, 17. I would also suggest that he speed up his top flats by using a double worm to drive the flats instead of the single worm the shops send out on the card.

He should also be certain he has the right number of card clothing wire, for this particular grade of cotton, and also that the card grinder has not at some time ground the wire too heavy, as this will cause a small burr on the end of the wire and the wire will hold small particles of fiber, turning them loose and causing neps. Mike (Ga.)

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EDITOR COTTON:

In June COTTON, "C. S. H. (Texas)" asks what makes neps? Cotton picked green, cotton that has several rains on it while in the field, contains these neps or little balls of fibers that have become stuck together through being wet or not fully ripe, and again these neps or balls are formed by the gin saws. The cotton gin, except in matters of detail, is about what it was 25 years ago; the teeth of the gin saws sometimes become rough or unpolished on their points thereby letting or causing some of the short fibers to attach themselves long enough to form little balls before being drawn away by the contact of the other fibers. To my mind, the gin saws make or form more neps than any other one thing.

If "C. S. H." has carding or spiked beaters, possibly they are making some neps themselves. What I said of the rough points of the gin saws would also be true with his beaters. "C. S. H." said he was running dirty, short staple cotton. This grade of cotton usually carries a good deal of neps, but I think "C. S. H." could point out to his cotton buyer the bad effects of these neps and ask him to lay off bales that seem to contain a large amount of these. He should then examine his blade beaters and have them good and sharp and set up close; if the finishers have Kirschner beaters, he should set them up to 3/16 of an inch. On the cards "C. S. H." might try stripping the cards once more a day—possibly on this grade of cotton the cards get full too quickly and are letting some of the neps come through. "C. S. H." says he sets his flats to a .005 gauge. I wonder if he is sure about this, or if he is taking someone's word for it. Grinders soon learn that close settings of .005 on flats usually result in a lot of dull and faced wire, and a great many won't use these close settings unless a close watch is kept on them. If "C. S. H." is able in some way to do away with the neps I would be glad to know about it through COTTON.

B. E. (Texas)

EDITOR COTTON:

"C. S. H. (Texas)," evidently another one of those "heavy lap, long draft boys," wants to know, in the June number of COTTON, what makes the neps.

"C. S. H." is all wrong. First, he is running a heavy lap and heavy card sliver; second, the card is doing too much work for dirty, short staple cotton.

Flats generally travel at the rate of 3¾ inches per minute, or 46½ minutes to make one round. There are 110 flats and 43 working on some cards. Therefore, each flat is in action about twenty minutes each round. There is only a small space of 3/1000 of an inch for the foreign matter to lodge in, and if the flat wire is fine (as it should be) this space will fill quickly and it being unable to collect any more foreign matter, the dirt and leaf, etc., follow the cylinder to the doffer.

So, a five gauge setting is wrong. Instead, he should reduce the weight of his lap, and also the weight of his sliver. Next, set all the flats to a ten gauge, and have a sharp point on all wires of each flat by grinding lightly and as often as possible.

By increasing the space as suggested, and by having the points very sharp, the foreign matter will not escape the action of the sharp points, and besides, the points will retain their grip on the matter long enough until added matter will force the preceding portion into the space described. By increasing the space he will of course gather more dirt.

I would recommend that "C. S. H." try an 11-ounce lap, and a 45-grain sliver, and that he set the feed plate as close as possible to the licker-in. Wash (Mass.)

EDITOR COTTON:

I believe "C. S. H.'s" question in the June number—what makes the neps?—should bring out some good discussion. I have never yet been in a mill where they run long staple cotton that they were not bothered more or less with neps. "C. S. H." says he is making a 13-ounce lap from dirty, short staple cotton. I have never had much trouble with neps on short cotton, but have had to get down and dig on long staple.

I would suggest to "C. S. H." that he first of all cut down on the fan speed on his pickers and run with just enough speed to furnish enough air current to lay a good, smooth sheet of cotton evenly from one end of the screen to the other, and I would put just a little longer draft on the cards, say 20 or 30 inches more. Next I would see that all the cards were set up well from licker-in to doffer. I don't know what settings "C. S. H." is using on the cards—he never said—but I will give him some settings I would use if I were running his job and on dirty, short cotton: Licker-in to cylinder, 7 gauge. Mote knives, just as close as possible without rubbing. Feed plate, 10 gauge. Cylinder screen, front, ⅛ of an inch; back, ¾ of an inch. Flats, 7 gauge all the way round. Front stripping plate, to take out all the strippings possible. Doffer, not too close; I believe a 10 gauge is close enough for the kind of stock he is using.

I would not ask "C. S. H." to go ahead with these settings on all his cards, but I would like to have him try them out on two or three cards, with a low fan speed on the pickers, and report the results back to us through COTTON. Bab. (N. C.)

Some Comments on Roll Settings.

EDITOR COTTON:

Several articles which I have seen in COTTON lately have influenced me to write the following letter. By way of preface let me say that the foundation of roll setting is nothing more or less than a few simple mathematical problems, plus a clear understanding of what is desired to be accomplished. Let us understand first that whatever setting we are using, it must of necessity be one which is greater from center to center, of even the closest set rolls, than the length of the staple being used. Every operation which a machine performs is supported to a greater or less degree by theory. Therefore, let us get as clear an impression as possible as to just how far this applies in roll setting.

In the first place, most all of us have stapled cotton more or less, watching as we draw the fibers between finger and thumb the gradual straightening out of the same, until we have our tuft of fibers ready for measurement. Now this process is identical with the one which takes place in the drawing rolls of any machine in the mill which employs drawing rolls. Therefore the process which the drawing rolls are actively engaged in is that of straightening out the fibers by means of friction, caused

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by the end of a fiber being held and drawn forward by a revolving roll, while the other end is drawn through a mass of fibers which are held by a roll which revolves at a less rapid rate of speed, this operation resulting in a certain amount of friction being applied to the loose end of the fiber, as it is drawn out of the tuft of fibers held by the other roll, the result being that due to the friction which is applied at this point the fiber is gradually straightened out.

From the foregoing it is hoped a clear understanding of the process going on in the drawing rolls has been obtained, so that we may pass on now to the reason for some of the things which are more or less of a puzzle to many. The ideal condition in drafting is to commence in a gradually increasing movement, until the highest point has been reached, this being necessary so that no undue strain shall be placed on the yarn. It is a well known

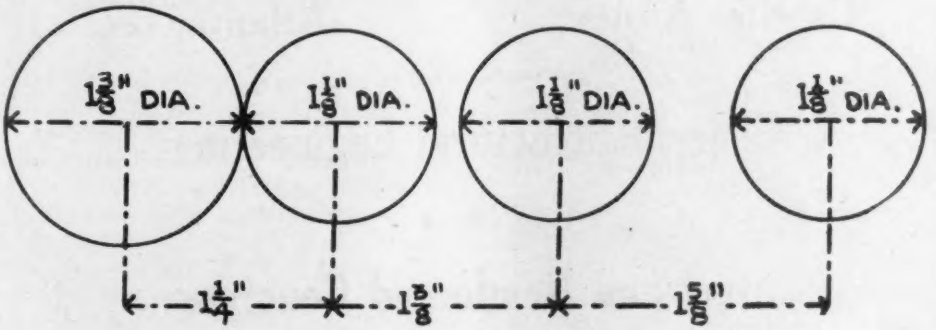

FIG. 1

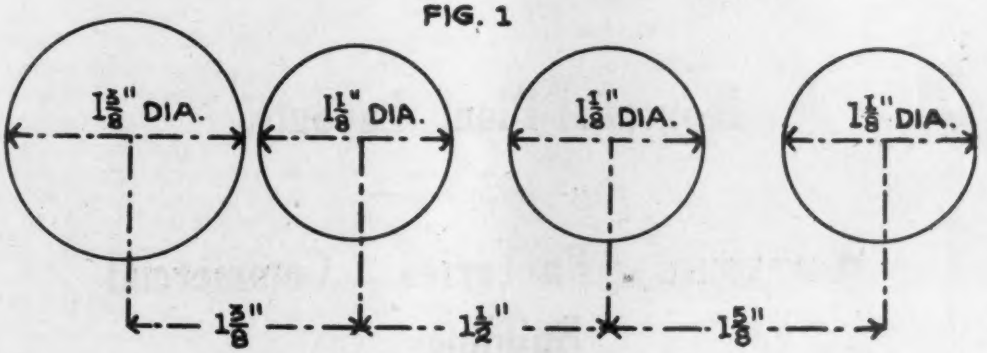

FIG. 2

fact to most of us that the faster the front roll revolves the closer must be the setting if good results are to be obtained, this being so it will more clearly assist us to see why, as the speed of the rolls toward the back are decreased, the settings are made wider. Let us first try to get a clear understanding of why this is done, and in order to do this it will be essential that we keep before us the fact that, as before stated, a gradually increasing movement is desired from the back roll to the front one.

Because of the very slow drawing away of the fibers between the third and fourth rolls, say for the sake of illustration on the drawing frame, it is not necessary that fibers overlap each other to such an extent in order to receive the desired amount of friction, hence the wider roll setting. As the speed is constantly being accelerated from this point, the reason for the gradually closing setting should be easily understood.

I am not going to go to work and say that the whole subject of drafting and drawing rolls is a simple matter, because a good deal of thought is necessary for the student to get a clear, thorough understanding of it—the fact that many of our advanced mill men have not fully grasped this vital question is constantly being demonstrated.

When I started this letter I didn't intend to develop a critical mood, and I hope our friend "J. F. L. (Ala.)" will not take this as an aspersion or reflection, but one statement he made in the May issue of COTTON, under the heading "Uneven Work Caused by Drawing Frames," stood out rather prominently. He says: "An excessive speed of the drawing rolls, with the rolls set too close for the staple, will break the fiber, caused from the friction drafting this heavy bulk, and if the rolls are set too far apart the sliver will be drafted in lumps. The setting of the rolls and the speed of the rolls are two very important features on the drawing frame, and unless correct can be very dangerous to the quality and evenness of good running, round yarn."

In connection with this statement, I would like to offer the accompanying sketch or diagram of a set of four drawing rolls. From this, and the explanation here given, it will be evident that a lot of the settings we see given at various times are very misleading if not entirely wrong.

The roll settings as outlined in Fig. 1 are the ones suggested by "J. F. L.," and in order to back up my statement that the various opinions as we see them given are often misleading, I wish to call attention to this in Fig. 1. Looking at this we find that if we set these rolls according to the directions of "J. F. L.," we shall have the first roll and the second roll in contact, because the front roll having a diameter of 1⅜ inch or 22/16 inch, would make the center of this roll at 11/16 inch. Continuing the diameter of the second roll would be 1⅛ or 18/16 inch, thus the center would be at 9/16 inch. Now the total distance would be 11/16 + 9/16 = 20/16 or exactly 1¼ inch, which is the exact distance he would set his centers apart. This,

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as will be seen from a glance at Fig. 1, is an utter impossibility, because this being an actual size drawing, it will be seen that there would be contact between the first and second rolls, and we all agree that this could not be so.

I believe that if "J. F. L." will look over the settings as given in Fig. 2, and, in the face of the plain facts as shown in Fig. 1, will compare them with the others, bearing in mind that these are for metallic rolls, he will agree that there evidently is something wrong with his first batch of roll settings. In setting rolls the main point I am sure we must all agree upon is that on no account must the length of the staple exceed the distance from center to center of any pair of drawing rolls, the rest, when fully analyzed, being a matter of speed ratios and sliver or yarn weights. Benjamin (Conn.)

A Question for Discussion.

EDITOR COTTON:

Having read the letters which appear in your magazine with great interest, I would like to ask some of your subscribers a question.

We are running 1⅛-inch cotton, double-carded, on old style cards, with two processes of drawing, slubbers, first and second intermediates and jacks, making a 9 hank roving for 48s warp and 58s mule spun filling. "Twist is a necessary evil; give me as little of it as you can," is a remark I got from our mule spinner. The 58s mule filling is running fine—in fact, the spinners say it never ran better—with 1.30 times the square root in the roving. But the 48s warp with 1.50 times the square root is going pretty rocky. The speeders are geared up the same except the twist gear on the jacks for the warp.

If the roving is running good on the mule with 1.30 times the square root and a draft of 12.90 in the mule, why does it go rocky on the frames with 1.50 times the square root and a draft of 10.66? There must be some reason for it. Someone may say "He doesn't have the right kind of cotton," or "The roving is no good," but here are two men spinning 48s and 58s, under the same conditions, one going fine and the other not. Here is a point for a discussion by some of your readers whose arguments I have read regularly. C. E. G. (Mass.)

A New Waste Press.

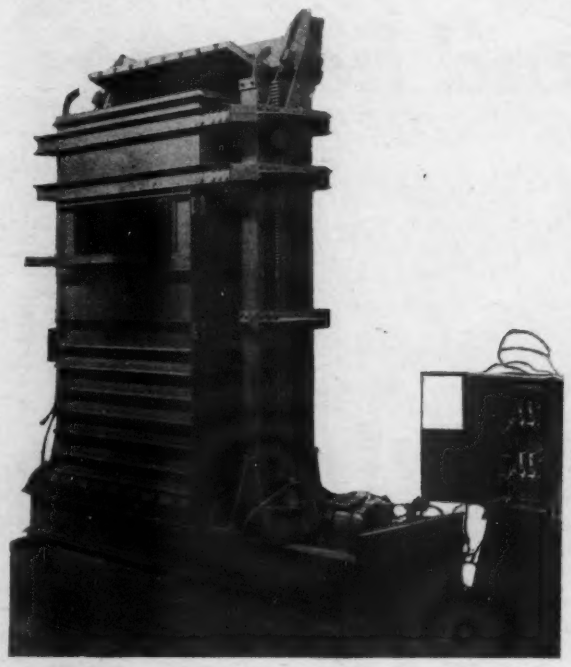
The waste press of the Rex Engineering Corporation of Dunkirk, N. Y., embodies many new features that will especially appeal to the mill man who is looking for speed of operation, heavy pressure and square ended bales of waste. Waste house space has been at a premium for the last two years due to inability on the part of the mills to sell most grades and because the room, in many cases, was taken up by badly packed bales.

With the push button control, an exclusive Rex feature with one or more stations, the operator fills the chamber, presses the button and then goes to his bins for more waste or gets his ties ready for the bale. When proper pressure has been exerted the motor is automatically shut off, being controlled by both electrical and mechanical devices. Another feature, said to be exclusive in the Rex, is that when the plunger is run up it also automatically shuts off the motor. One added feature of this new press is that upon release of the pressure it is claimed there is no violent rebound of the plunger, racking the machine and putting a heavy strain on the mechanism.

The push button control is especially advantageous to mills having a two-story waste house. To those using the old presses this will immediately appeal as there is no running up and down stairs between fillings of the chamber. An additional push button station is placed on the second floor where the operator, by simply pushing the button, manipulates the whole machine.

There are no clutches, very few gears and a very simple mechanism, nothing to cause trouble; such repairs as may be necessary can easily be turned out in the machine shop of the mill.

The pressure used is from two and a half to three times that generally used. A direct connected motor of ample



power is used, and the press is self-contained and takes up only a small amount of room. It is rapid in operation, heavy in construction, and is being put out with a very rigid guarantee as to durability and as to what it will do. The screws are self-cleaning on both up and down strokes and the gears are of cut steel.

The cut-off devices are of the electrical and mechanical positive types, and fully protect the machine from any careless operator. In fact, unless the proper button is pushed no movement of the mechanism takes place.

The Rex Engineering Corporation is represented in the South by J. S. Hulme, Atlanta Trust Co. Bldg., Atlanta, Ga.

It is announced that a bobbin factory is to be erected at Greenville, S. C., by Norris Brothers, who already operate a shuttle factory in that city. The new building will be 40x128 feet, two stories, and will be modern in all respects, with daylight construction. This is stated to be the first bobbin factory for Greenville, and the second in the South. It is said the building will be completed by October. V. M. Manning, well known in the southern textile field, became connected with this organization a number of months ago as manager of the mill supply department.

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An Old Timer Says—

(*Continued from page* 787.)

the builders of the brushing machine if you do not care to go to the trouble of sharpening them.

Down under the brushers, where the door is located to give access to the fan, we found several large cracks in the woodwork, and the doors did not fit very well—to tell the truth, one of them was off and gone. The overseer did not need telling that fixing these things would help his air draft and prevent much dust fly going out into his room.

Next we came to his inspectors. They were doing good work while we were looking at them, and I related a little system to my friend which I believe will do more toward getting inspectors to do good work when you are *not* looking at them than anything I know of:

Have your second hand each day pick up a cut of cloth from each inspector which has been passed as firsts by them. Look through these cuts carefully and enter on a record all defects or work the inspector should have done to improve the quality of the cloth.

Turn this record over to the overseer. After the system has been running long enough to show pretty well how each girl is inspecting, let the overseer say to Mary: "You are not taking enough time scratching up your thin places." To Anna: "You are not washing out your oily places quite well enough." Show Lula a cut in which she has let several places get by that should have been worked on. If you have a real careless inspector, take her off her regular work and put her with the head inspector or one of your best inspectors, and tell her she is letting so much bad cloth go by that you do not believe she knows just what you want done; therefore you want this good inspector to teach her.

Everybody in the room will soon know all about it.

Don't let your second hand have any regularity about what time he selects this one cut of cloth from each inspector. Sometimes in the forenoon, sometimes afternoon, sometimes late, sometimes early, etc. In a few weeks they will all show much improvement because they do not know when your second hand is going to pick up a cut of their cloth for examination.

Both the overseer and superintendent liked the idea and said they would try it out.

I noticed the preparation they had for washing oil was not taking the oil out without much unnecessary scrubbing, so I asked them to try "Old Timer's formula, which is as follows:

One ounce of chipped or pulverized castile soap.

Two ounces of ammonia.

½ ounce of ether.

½ ounce of alcohol (wood or grain).

Five gallons of gasoline.

Dissolve the soap in warm water and add the other ingredients slowly.

This preparation can best be used in spring bottom oil cans with the stem cut off to enlarge the hole and made smooth to use the steam as a scrubber instead of using a paddle. It will not only take the oil out, but will dry very quickly and leave no stain on the cloth. Then here's another good formula: 20 gallons of boiling hot water; six pounds of chipped or pulverized castile soap; two quarts of silicate of soda (stir until well dissolved); and one quart of carbon tetra-chloride (pour in very slowly while stirring). Then add 10 gallons of cold water and you have 30 gallons of oil remover that will certainly do the work.

I prefer the first formula because it dries so quickly.

With both preparations you will need a board about 10 by 12 inches, covered with several thicknesses of cloth, to place under the cloth containing the oil spot, while applying the preparation and for a foundation to scrub on.

We were standing not far from where the "grader" was cutting the bad places out of the cloth which had been classed as seconds by the inspectors, and I noticed a large box of rags nearby.

"Great Scot, man! Look at that box of rags that grader is leaving about four to eight inches of cloth on each side of every bad place he cuts out," I exclaimed. "When have you ever stopped to look through these rags before?" What the superintendent said won't do to print here, but he said it just the same, so we will have to pass on.

I was afraid to say any more about rags right then, so we stood in silence watching a folder until the folder hand started a new cut of cloth on his folder, and darned if I could hold in any longer.

"You are very liberal with your cloth," I said. "You must be making more money than your stockholders want." "What in the dickens do you see now?" he retorted. I told him the end of the cloth the folder hand doubled back when he started the fold was over a half a yard long when it should be exactly a half yard or should only reach to the middle of the folder table. The overseer got his yardstick and we looked over several folded bolts on the table, but we did not find a single piece in which this first ½ yard didn't measure two to six inches too long. The other folder hands were doing the same thing.

By this time the overseer was getting pretty well worked up, and was beginning to use some language that should not be classed as good United States. However, I slipped in one more little suggestion, that it was a very good practice to take a few cuts of cloth every three or four months, stretch them out on the floor, in the weave room or on any floor long enough to allow the bolt of cloth to be laid out straight, then measure the cloth with a steel tape and thus check up on the folders. You know, if a folder is set to fold exactly 36-inches per fold on 80x80 goods, it will probably be different on 56/44 goods.

"Yes Yes! I know all these things you have been pointing out to us, and I suppose we have been a little careless here lately." My friend was beginning to cool down some, and the overseer was not saying a word, but he was terribly red in the face, so I took courage to say just about what I wanted to. "Well, friend superintendent, you know we all get careless sometimes and some of us carry the thing so far until we hurt our jobs before we realize it. If the overseer and superintendent are careless, how can you expect the help to be otherwise?"

About that time two girl weavers came into the cloth room to weigh themselves on the cloth room scales. One of them had on cloth slippers and they both had on aprons which looked like they had been torn off a cut of cloth that day.

"How much do you suppose they'd weigh if they pulled off all that cloth?," I asked.

"There you go again," said my friend. "Come on over here to the press and let's see if the press is pressing the

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cloth too hard to suit you or anything like that."

"Darn!" I ejaculated. "You must be getting burlap mighty cheap, the way you are wasting it. Don't you see that pressman is folding under about six inches at every place where he is sewing the burlap together?"

We cut the sewing thread loose from a bale and measured the burlap which had been folded under. After allowing about two inches to turn under, which the overseer said would be enough to prevent the sewing thread from pulling out, we found they were using 10 to 18 inches *too much* burlap on each bale. I took out my scratch pad and began to figure again; 125 bales put up per week. 10 inches burlap on each bale. 1,250 inches or about 35 yards wasted a week.

"How much does it cost per yard?" I asked.

"Oh hell, I don't know," replied my friend.

The whistle blew for stopping time. "Goodness, I had no idea it was so late. I certainly am sorry I haven't had a chance to see all of your mill," I said.

"Don't you worry yourself about that at all," replied my friend. "You just come back here in about five years and I'll let you inspect another room."

Moral: Mr. Superintendent and Overseer, you had better not take this too humorously until you have a look into your own cloth room to see if you will have to admit, as my good friend did, that you have been a little careless lately."

And, Mr. Carder, Spinner or Weaver, if all this work could be found in a cloth room, where there is very little machinery in comparison to your department, honestly now, will you invite me over to look through your room as my good friend did?

No? Well, suppose you get busy then for your own good.

Dyeing Union Goods With Sulphur Colors.

EDITOR COTTON:

We contemplate running part of our mill on cotton shirtings containing a silk stripe. Is it possible for us to dye these goods in the piece so that the silk stripe shall remain white after dyeing, and also would it be possible to dye (in the piece) the stripe into one color and the cotton portion of the goods into a different color, as, for instance, a black cotton piece with a white silk stripe, or a yellow or a light blue stripe?

Also, could this black and white effect, etc., be accomplished without any danger of subsequent tendering if the sulphur colors are used as the dyeing agent?

I. C. A. (N. J.)

EDITOR COTTON:

It is quite possible for "I. C. A." to dye silk stripes with the sulphur colors and have the stripe remain white or even a different color as he suggests; moreover, this can be done without subsequent tendering of the goods if he will carry out the following suggestions:

In the first place, it is understood that the filling of the goods, being all cotton, will dye black, therefore it is necessary that the stripe be of a 4 or 6-harness twill type so that the filling is well covered and does not show through.

The goods may be dyed without previous preparation, but I should prefer, in the interests of uniformity, to wet them out thoroughly before entering the dyebath; this may be done in a weak bath of soap or soluble oil and water at a temperature of not over 100 degrees F. If this is done the subsequent dyebath may be run cold, or nearly so, which is a desideratum where silk is concerned.

The sulphur dyestuffs are little used for wool or silk dyeing because the alkaline baths are injurious to these fibers; but the addition of glucose to the bath protects these fibers to some extent, thus silk stripes may be dyed in the presence of glucose and the further addition of glue or casein prevents silk from taking the color, and thus mixed silk and cotton goods can be dyed in two-color effects.

The goods may be dyed either on the jiggers or the padding machines at not over 100 degrees F. The dye bath is prepared as follows: 100 gallons water; 5 pounds sulphur black; 7½ pounds sodium sulphide crystals; 3 pounds soda ash; 40 pounds Glauber's salt; 20 to 30 pounds casein or glue.

For the dyeing of subsequent lots of material, the amount of dyestuff should be reduced by one-third and the quantity of casein by one-half.

In order to obtain very brilliant tones of black the goods should be after-treated at 100 degrees F. with a solution of 2 per cent bichrome, 2 per cent copper sulphate, 4 per cent acetic acid and finally rinsed and soaped.

The casein solution is prepared as follows: Mix the casein to a paste in a little water, add 1 to 2 gallons of cold water, heat to 160 degrees F. and then add 50 to 75 c.c. of ammonia; stir until clearly dissolved.

I would say that while generally the goods receive some kind of after-treatment, as with metallic salts as indicated, copper salts especially are likely to assist in the oxidation of the sulphur in the dye by catalysis, thus forming sulphuric acid, which weakens the fiber after a time. A further after-treatment is therefore advisable and this is sometimes accomplished by running the goods in a bath of soda, soap or sodium acetate to prevent the subsequent "tendering" of the goods. This tendering does not become obvious for several weeks or months after the goods are dyed, and has caused much damage to goods in storage.

Probably the most efficient method of preventing the subsequent tendering of the sulphide colors, especially the blacks, is by the application of tannate of lime to the dyed fabric.

It has been found that the formation of sulphuric acid in sulphur dyed colors is not due to the presence of the sodium sulphide used in the dyebath, but to the oxidation by taking advantage of the affinity exercised by tannic acid coming from outside sources. It will be seen from this that a mere removal of the sulphide used in the dyebath by washing will be of little use as a preventive of tendering and all the known methods suggested for securing the fiber from attack by the sulphuric acid eventually formed possess a common disadvantage in that the salt or compound used for impregnating the dyed material is soluble in water and is consequently removed and therefore inoperative when the goods are wetted or washed. Now by taking advantage of the affinity exercised by tanic acid for the vegetable fiber and also its capacity for combining with a suitable salt of lime to form a compound insoluble in water yet very ready to unite with sulphuric acid, the

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tendering of the goods may be very materially and permanently prevented.

After dyeing in the usual manner with a sulphide dyestuff and washing thoroughly, a treatment for a few moments with a 1 per cent solution of tannic acid on the amount of water at a temperature of 100 degrees F., squeezing and then passing through lime water cold, and finally washing, suffices to exercise a very pronounced protective influence. This also adds to the weight, improves the depth and tone of the black and increases the power of the dyed material to absorb starch.

It is possible that this tannate of lime treatment may slightly alter the shade of some colors, and it is up to the dyer to make some tests in this direction before using, but it is all right for blacks or dark shades; a treatment of one per cent of soda ash may be found sufficiently effective in some colors.

In the case of blacks with silk stripes, the goods can be topped with shades of blue, green, pink, yellow, etc., forming silk stripes of these various colors on a black ground. W. B. (Maine)

Two and Three Process Picking and Drawing.

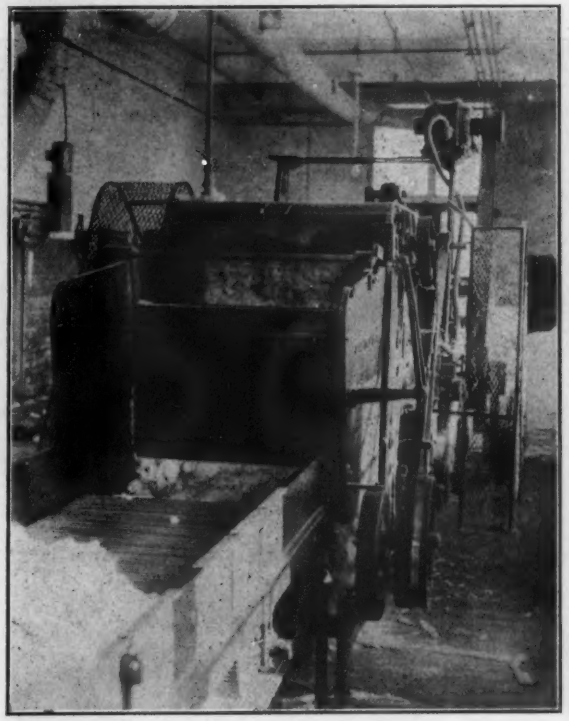
EDITOR COTTON:

I notice in the June issue that "K. C." is pretty hot after "Wash" for the stand he had taken in favor of two processes of picking and two-process drawing. I, for one, am a firm believer in the two-process picking, and also in one-process drawing, for I can say that the best and prettiest yarn I ever saw made with two picking processes and one process of drawing and, mind you, this was not a low-grade cotton, nor 10s or 20s yarn, but 60s to 80s combed peeler, 1⅜ inch cotton.

We are all aware of the fact that the more we beat and the more we draft, the weaker yarn we are going to get. "K. C." says with only two processes of picking, the closer we have to watch the automatic feed box. I want to say that the mills to which I have reference have long aprons behind the feed box which are placed from the end up to the feed box with cotton. The feed box has an automatic feed door on it which only allows a certain amount of cotton to be fed in at a time. This door has a weight on it so arranged that when a certain amount of cotton gets into the feed box it will knock off, stopping the feed; and when the cotton gets so low in the box it will again move the belt to the tight pulley, starting the feed apron, and in this manner keep a certain amount of cotton in the box at all times. See illustration. And these mills make a 11 or 12-ounce lap and draft the cards close around 100, not less than 95 nor more than 110.

I am like "Wash"—I can furnish the names of four mills, one in North Carolina, that use only two processes of picking and one process of drawing on fine combed yarns from 60s to 80s, and these mills have never been on short time and make as good a yarn as any mill in North Carolina. If "K. C." would like to have the names of these mills and the names of the superintendents, he can get them through the editor of COTTON, as I will furnish him this information if he writes me.

"K. C." says he has been a practical carder for 35 years and knows what he is talking about. I will say that I am a young man, not that old yet, am only 31 years of age,



THE APRON, FEED BOX, AND AUTOMATIC FEED DOOR. THE COTTON WAS PULLED BACK IN THE PICTURE TO SHOW THE SWINGING DOOR CLEARLY. THE BELT SHIFTING DEVICE IS SHOWN AT THE RIGHT.

with about 12 years carding experience, but all my experience has been practical and in the best mills in North Carolina, and I believe that when "K. C." thinks the only way to make good yarn is with three processes of picking and two or three processes of drawing, he is all wrong.

B. A. B. (N. C.)

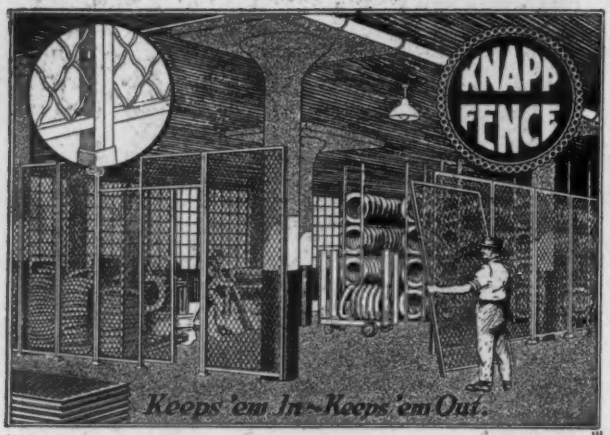
Is There a Limit to Card Drafts?

EDITOR COTTON:

In the June issue of COTTON a compliment has come my way, and I could not have wished it from a better source, first, because my heart and soul are in this department, and second, "K. C. (Conn.)" has proven himself a practical man and a valued writer. "K. C." terminates his splendid letter in the June issue by stating, "but I have had 35 years experience as a practical carder, and know what I am talking about." True, and this latter can be said about all other contributors to this department. COTTON without doubt has the highest grade of contributors, and so far ahead of other textile journals, that there is no comparison.

However, we must admit that even when we think we know what we are talking about, we are often on the wrong track. No man is always wholly right or wholly wrong. Therefore, we criticize one another, not with the spirit of getting the best of the individual, but instead, to clarify and drive home the best practical points for our mutual benefit. I realize that I have been misunderstood on this point many times, but I hope "K. C." will not class me as an ingrate after reading this letter.

The question being discussed is "What takes place in



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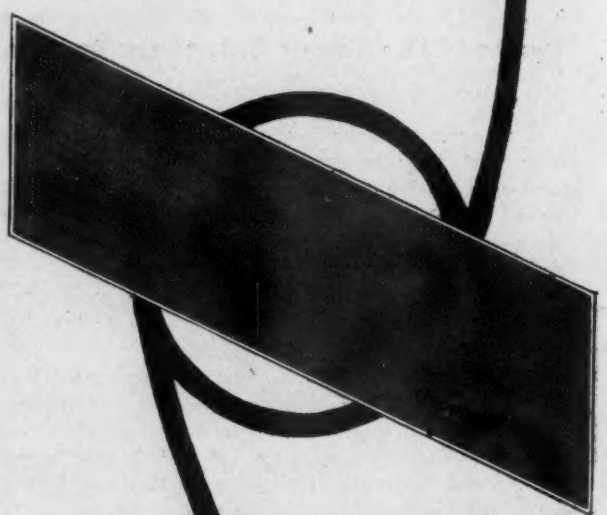

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the card when the draft is increased from 100 to 150 inches, and why not get the full benefit by making it 200 inches?" The answers of "K. C." and "Tom (Mass.)" remind me of the story of the two churchgoers who claimed they knew the Lord's Prayer. They were arguing when a third party came along and agreed to be stakeholder for the wager. When the money was put up it was agreed that one should recite the Lord's Prayer, so he began as follows, "Now I lay me down to sleep; I pray the Lord my soul to keep, * * * ." "Give him the money," said the other man, "I never thought he could even start it."

In answering my question, "K. C." states, "Well, when I changed to a heavy lap, I didn't notice that anything unusual or alarming took place in the card. But I did notice that I got a cleaner and more even sliver without any loss in any other way." "Tom" says, "I am in favor of a long draft where there is any combing process." So he would have us believe that we have a combing process at a point from the bite of the licker-in to the feed roll, for at this point only a change is made when the draft of the card is decreased or increased. He claims that I put the question to secure information without going to the trouble of getting the experience, which he claims is a failing in a whole lot of carders. "Tom" is right. I am ever seeking information and experience; otherwise I would not be a subscriber and contributor to COTTON. But in this case I am like the stakeholder in my story. "Tom" did not give us any information or experience. Instead of answering my question, he hands out a lot of trite stuff that we always knew.

Here is the answer to the question: There is no change in the card, the change is only between the feed roll and licker-in. Let us assume that we have a draft of 100 on a card, and the weight of the sliver is 40 grains to the yard. Now, without changing the weight of the sliver, we increase the draft to 150 by, of course, increasing the weight of the lap. Therefore, the only thing that is changed is the speed of the feed roll which is reduced, and by reducing the feed roll speed and exposing the fibers to a severe treatment for a longer period, it makes the work cleaner and stronger as claimed by "K. C." and "Tom."

Now, "K. C." and "Tom" must admit, that when the weight of the sliver remains the same and the draft of the card increases, the licker-in conveys the same amount of stock to the cylinder. So we have the same condition in the card. Nothing unusual or alarming can take place when the same amount of stock is fed to the cylinder and flats. The only place to be considered is the back of the card. When we run a heavy lap, we generally set the feed plate a little more away from the licker-in, which allows a quantity of loose cotton to jump into the licker-in as so ably described by "Tom" in his June letter. That a short draft and a light lap and the feed plate set as close as possible to the licker-in is best, can be easily proven.

But what's the use of arguing? Let the reader make the following test: Make a light and heavy sheet of lap from the same bale of cotton, run the same number of pounds through the same card, next weigh the droppings, and find that "Uncle Wash" is right. Care should be taken to set the feed plate as close as possible to the licker-in when running the light sheet of lap.

As regards the efficiency of two and three processes of pickers and drawing, I think my article in the June issue on "The Law of Compensation" answers "K. C." on this.

Now let us examine the claims of "K. C." and "Tom":

"K. C." says, "a good many years ago it was generally supposed that a quick-running feed to the beater was the best method. At the time it was believed that the cotton was cleaned and opened better in this way. But later experiments were made on a set of machines by reducing the speed of the rolls and feeding heavy to the beater, with the result that the carding showed an immediate change for the better, both in cleanliness and character."

Now, is it not fair to assume that the defect in the yarn, that he says can be improved by another process of drawing, may be due to a long draft in the preceding processes? And as regards the picker draft, is it not a fact that the slower the feed roll on a picker is run, the number of blows to the inch is increased correspondingly? It is the same reasoning here as on the card. The more the fibers are exposed to the severe treatment of the licker-in teeth, the less coherent the stock will be. However, "K. C." admits that 200 inches is going to extremes, and so do I.

"K. C." is right again when he claims that it is more difficult to make an even lap without the intermediates. However he must admit that the tender has more time for this extra vigilance by having less machines. He is also dead right as regards short draft on speeders, for I had that experience and it was not so long ago that I explained the reason in one of my letters in this department.

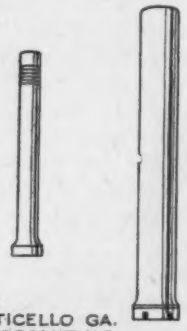
"Tom" begins his letter in the June issue by announcing that he is one of those "heavy lap, long draft boys." He must picture in his mind that the fringe of cotton hangs over the feed roll on the picker, and that the same fringe hangs over the feed plate on the card and the licker-in teeth comb the fringe and extract all the foreign matter and all the clean fibers are conveyed to the cylinder. Sounds nice, and we wish it was possible—it can be done on paper, but not in practice.

"Tom" seems to have the only dope in making an even sheet of lap. I never could make a lap but what a variation of at least four grains to the yard could be found in the sliver. But let me say here that what "Tom" says in regard to an uneven lap for a long draft is just as detrimental in the case of a short draft.

In the eighth paragraph, "Tom" states, "Of course, 'Wash' will allow, and I agree with him, that short draft is the proper thing where drawing rolls come into play." "Wash" agrees to no such thing. The drawing frame is the place to draw, but not over six.

In his ninth paragraph, "Tom" claims that by exposing the fibers at the mercy of the licker-in teeth, and to the period of time equal to a draft of 300 inches if possible, makes the fibers stronger. I wonder why they have the short, medium and long nose feed plates on the market? Is it not a fact that the distance from the bite of the licker-in on the feed plate to the bite of the feed roll must in all cases exceed the average length of the staple by at least ⅛ of an inch? If this is wrong, then I know nothing about cotton carding. Again, if this is wrong, why change the feed plate?

I think "Tom" is dead wrong in his claim about the combing action at this point, because, as pointed out, the distance from the bit of the licker-in to the bite of the feed roll must exceed the average length of the staple, and with such a setting (which is the proper one) the fibers



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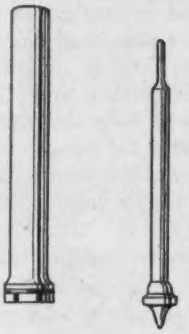

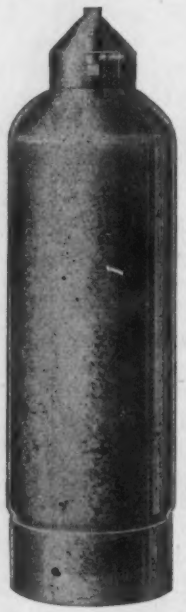

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are not held by the feed roll as "Tom" would have us believe. "Tom's" reasoning would be all right if the licker-in fillet had as many points of wire to the square foot as that of the cylinder. When a heavy sheet of lap is run, most of the stock enters the grooves, and the stock detaches by its lateral motion, and, as stated, the action here is the same as a slow running feed roll on the picker. The stock is simply subjected to a more severe treatment. However, there is no combing at the back of the card, the combing is done between the flats and cylinder. The best carding was done and is done today without a licker-in or a feed plate.

When setting the card after grinding, let the reader notice the difference in the setting at a point, say, about 1½ inches from each side of the licker-in. A difference of from 7 to 10 gauge will be found. It is necessary to set closer in the center in order to have each side of the licker-in do the work it should. This is the result of a heavy lap. On all cards there is a guide on each side of the sheet of lap, and most of the time, the edge will double, which doubles the work of the licker-in teeth at this point, and of course in a short time we have the condition described, which means a new licker-in in a short time. Now let's picture what happens when "Tom" runs an 18-ounce lap; at the edge the fibers fed to the licker-in equal a sheet of lap weighing 36 ounces.

Again in the ninth paragraph, "Tom" asks, "Do we not know that when a small particle of dirt has been allowed to remain in the web there is little hope of its being removed, and as it passes under the leather roll of a speeder or spinning frame, doesn't it cause the rolls to jump?" I have heard of such a case. But have I not proven in this letter that without changing the weight of the card sliver the same amount of fibers are conveyed to the cylinder by the licker-in? Again, are not the flats supposed to do most of the cleaning? Does "Tom" have more fly and seed at the back of his cards than he does strips?

"K. C." and "Tom" have their minds so centered in a long draft that they would have us believe that by just increasing the draft of the card all is well; the settings are not important. This reminds me of Contributor No. 19, who claimed he was puzzled by my mill experience in having such a high speed on my front roll, and up to this writing he doesn't know the diameter of my front roll, and did not take the trouble to ask.

Now let us all read the last lines of "Tom's" letter, "and then get busy and have some small draft gears made for (our) cards and enjoy good sizing, clean yarn, strong yarn, and happiness."

I hope "Tom" will answer the following questions: (1) If a sheet of lap is uneven, why is it that it runs well in the case of a short draft, as "Tom" admits in his letter? (2) If a long draft is not the cause of wearing the licker-in teeth on each end, what does this? (3) Is the stock taken from the feed roll by the point of the saw-toothed fillet or by the grooves? (4) Why does the flat rest on the rigid bend so that the toe of the flat is 3/1000 gauge farther away from the cylinder than the heel? (5) In changing from 1-inch stock to 1½-inch stock, with a short nose feed plate, is it necessary to change the plate and why?

Wash (Mass.)

Pull don't get you half as much as *push*.

Indigo.

(*Continued from page* 786.)

STRAW.

300 parts chrome yellow
10 parts Prussian blue 25 per cent
70 parts 6 per cent tragacanth thickening
300 parts 40 per cent albumen
40 parts rape seed oil.
Grind and add
120 parts bichromate of soda
100 parts caustic soda
60 parts water.

GRAY.

250 parts lamp black
280 parts 6 per cent tragacanth thickening
200 parts 40 per cent albumen.
Grind and add
120 parts bichromate of soda
100 parts caustic soda
50 parts water.

RED.

200 parts vermilion
100 parts vermilion substitute
140 parts 6 per cent tragacanth thickening
90 parts bichromate of soda.
Grind together and add in turn
145 parts 6 per cent ammonia
20 parts rape seed oil
30 parts turpentine
275 parts 50 per cent egg albumen.

GREEN.

200 parts Guignet's green
100 parts chrome lemon yellow
100 parts 6 per cent tragacanth thickening
300 parts 40 per cent albumen.
Grind and add
120 parts bichromate of soda
100 parts caustic soda, 70 degrees Tw.
50 parts water
30 parts turpentine.

Shades of olive can be made by mixing yellow, green and grey and other shades by various mixtures of the foregoing colors, in fact almost any shade can be produced.

After printing the foregoing colors the cloth is dried and passed through the following bath at 60 degrees C.:

60 parts sulphuric acid, 168 degrees Tw.
20-30 parts oxalic acid
910-920 parts water.

It should take the cloth about ½ minute to pass through this acid bath, it must be kept sour by feeding fresh liquor to it as needed. The goods are finally well washed and dried.

The strength of the acid bath varies in different works, but the foregoing gives good results.

Some very handsome and cheap dark shades are obtained by first dyeing the cloth a light indigo blue and then padding it in a weak aniline black bath. The same principle may be applied somewhat differently in the production of discharge effects on a two color ground of indigo blue and aniline black. The light blue goods are printed in chromate discharges containing an excess of soda ash; they are then covered with a pattern in aniline black, dried, passed through the rapid ager to develop the black,

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and finally soured in sulphuric and oxalic acids as described. The presence of the free alkali prevents the development of the black on the printed parts so that a clear cut pattern in discharge colors appears upon a blue and black ground. The following will illustrate:

WHITE.

60 parts bichromate of soda
150 parts soda ash
200 parts water
590 parts British gum paste.

YELLOW.

40 parts bichromate of soda
100 parts soda ash
120 parts British gum (dry)
10 parts olive oil.

Heat until the gum is dissolved, then cool off and grind in:

260 parts chrome yellow paste
160 parts 40 per cent albumen.

Print on light indigo dyed cloth; dry, cover in a prussiate aniline black, pass through the rapid ager, discharge in acid bath, wash well and dry. A red may be obtained by using vermilion in place of chrome yellow and other colors in a similar way. The insoluble Azo colors may also be used in the indigo discharge process, using the stable diazo compounds of the para- and meta-nitranilines —Azophor red R.N. and Azophor N6N—though the ordinary diazo printing colors may be used with equally good results.

The discharge colors are made up as usual for Azo colors plus the required amount of bichromate of soda, and are then printed on indigo dyed cloth prepared in B-napththolate of soda thus:

112 grams Azophor red or orange and 300 c.c. water.
50 c.c. caustic soda and 150 c.c. water.
400 grams 6 per cent tragacanth thickening.
150 grams bichromate of soda.

Print on indigo blue cloth previously padded in naphthol prepare; dry, and pass through ordinary sour (cutting liquor); wash well and dry. Napthol prepare is made as follows:

30 parts B-napthol
45 parts caustic soda, 36 degrees Tw.
25 parts Turkey red oil
6 parts tartar emetic
7½ parts tartaric acid
886½ parts boiling water.

The prussiate and chlorate discharges on indigo are not much used and so I will not bore the reader by discussing them, except to say that for dark shades of indigo the chlorate discharge is not so apt to tender the goods as the chromate discharge.

Freyberger's Nitrate Discharge.

This process consists of printing on the indigo-dyed fabric a nitrate and then running the goods through fairly strong sulphuric acid. If the acid is weak, practically no action takes place.

A 12 per cent solution of nitric acid acts very slowly on indigo dyed goods, but the same strength of acid, if diluted with sulphuric acid of 50 per cent strength instead of with water, instantly destroys the indigo. If the concentration of the sulphuric acid is increased to 70 per

cent, even 6 per cent nitric acid is sufficient to discharge the indigo. The presence of a small proportion of nitrite in the discharge renders the process more effective.

A good white with clear outline on dark indigo may be obtained by printing the following:

400 parts nitrate of lead
50 parts nitrite of soda
550 parts British gum thickening.

Print and dry and pass through cutting bath of sulphuric acid of 100 degrees Tw. at 75 degrees C.—4½ seconds passage, squeeze and wash thoroughly immediately. This discharge does not tender the goods in the least, and the white remains good even after treatment with alkaline lyes.

The lead sulphate remaining on the fiber can be dyed into chrome yellow if desired by passing the goods through a bichromate. Colored effects may be obtained by adding diazotized amines to the white discharge paste and printing on indigo-dyed fabrics previously prepared in B-naphthol.

The nitrate process is cheaper than any other, and is especially adapted for discharging very dark blues.

Discharges on Indigo by Reduction.

Perfect whites can be obtained on indigo dyed goods by means of the hydrosulphite formaldehydes, these compounds are thickened and printed on the dyed fabric, which, after drying, is steamed for three to five minutes at 102 degrees C. in dry air-free steam and then soured, washed, and soaped. Another method is to pass the steamed goods through a hot bath of sodium bisulphite before the treatment with alkali. Soda ash may also be used.

WHITE DISCHARGE.

200 parts hydrosulphite N.F. conc.
200 parts gum senegal, 50 per cent.
420 parts 50 per cent china clay paste
180 parts saturated solution of bisulphite-acetone.

Print, dry, steam in the "hydrosulphite" ager for three to four minutes, and then run through a boiling bath containing 10 grams of soda ash per liter. Wash, sour, wash and soap lightly. It is imperative with these discharges, to wash the goods in alkali immediately after steaming to remove the reduced indigo, otherwise the indigo will become reoxidized into indigo blue. The rapidity with which this reoxidation takes place renders the process a very difficult one, and hard to control on a large scale, and it was at first a great obstacle to its general adoption. It is evident that to secure regular results from hydrosulphite alone, special arrangements are necessary in order to insure that the printed cloth has an uninterrupted run through the whole process. If the goods are allowed to lie after steaming before washing off in the alkali the clearness of the white is either impaired or spoiled altogether, therefore, any hindrance to the continuity of the process results in bad work and spoiled goods.

The addition of anthraquinone to the discharge pastes, it has been found, with the further addition of zinc oxide and neutral acetin, made it possible to allow the goods to lie for about half an hour between the steaming and washing off operations. The presence of anthraquinone improves the whites and renders them more stable in the air by retarding the oxidation of the indigo white, its action being probably due to the formation of oxanthranol, which, by becoming oxidized first, protects the indigo white for a certain time.

If the printed goods cannot be washed off immediately after steaming, it is advisable to wrap them up from the air and store them in a warm, dry place. Whenever it is possible, however, the washing off in alkali should be proceeded with at once.

A discharge white with anthraquinone is made as follows:

WHITE.

200 parts hydrosulphite N.F. conc.
580 parts British gum thickening.

Heat until dissolved, cool, and add

75 parts zinc oxide
75 parts of water
50 parts anthraquinone paste, 30 per cent.
20 parts acetin (neutralized with soda).

Print on dark indigo blue, dry, steam four minutes at 102 to 104 degrees C. in air-free, fairly dry steam, run at full width through a boiling one per cent solution of silicate of soda, and finally wash and dry. In spite of the great improvement effected by the use of anthraquinone, the hydrosulphite process still left much to be desired, and it was not until the introduction of the leukotropes that it was finally put on a thoroughly practical basis.

The leukotrope process of discharging indigo differs from the earlier hydrosulphite processes in that the indigo white produced on the fiber is at once converted into stable yellow compounds, which are soluble or insoluble in alkalis according to circumstances.

(This is the fifth of a series of articles on this subject by Mr. Nanson. The sixth and last article will appear in an early issue.—The Editor.)

Some Interesting Points on Carding.

EDITOR COTTON:

Being interested in the origin of the various machines which go to make up a modern cotton mill, I have gone very deeply into the subject and shall endeavor to give a little of the information I have unearthed in regard to the card. In the first place, how many men know where the name "card" came from? This machine derived its name from a thistle, of the teasle variety, by name "Cardus," this plant having been used for the purpose of carding before wire cards were ever invented.

The first machine for the manufacture of wire card clothing was invented by Amos Whitmore in 1797 and from that time on a steady improvement in the type of wire used may be noted. As is most generally known, there are three methods of setting wire in the foundation, namely, plain, twilled and rib set. The main topic of discussion for a long time, and one that is still argued, is the shape of tooth best suited for all types of carding. After the invention of the draw plate in Germany in the 14th century, a long drawn out series of experiments were carried out to determine the best and most suitable type of wire and as a result of these experiments, the method of hardening and tempering wire in a continuous length was patented by Ashworth Brothers in 1878.

For a long time very serious objection was made to the use of this type of wire, as it was claimed by a great many experts and others that its use would damage the fiber. Remember that up to this time, soft steel wire had been used for the purpose of making card filleting. Not until the process of hardening and tempering in vacuum was introduced by Bateman at a later period,

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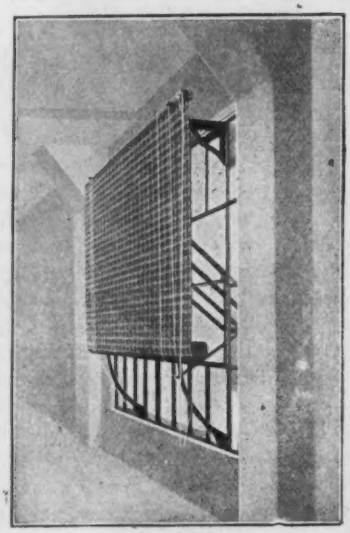

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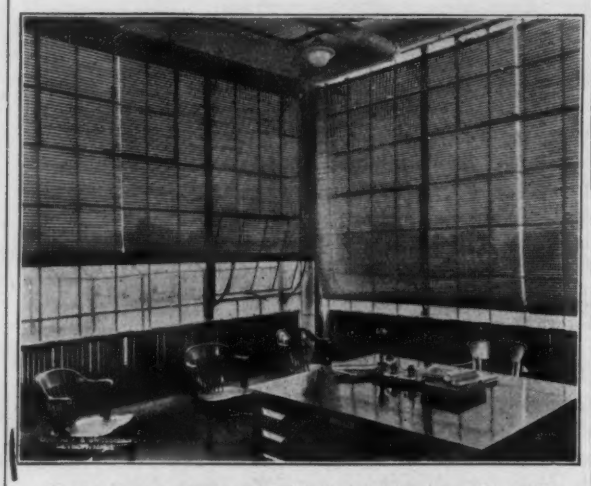

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to prevent oxidization from chilling the card tooth and crusting it with a hard coating, was the objection to this kind of wire removed. At the present time this process is carried on by electricity, resulting in an absolutely even temper and a silvery finish.

The various types in card clothing as developed from time to time are: round, angular, convex and flat wire, these being given their shapes by being pressed or flattened between steel rolls. These were the so-called fancy wires, which have since been displaced almost universally by the use of the side ground wire, this grinding reducing the sides of the wire tooth from the knee to the apex or point.

When starting new cards a very good method and one which has been found to give excellent results is to first grind the cylinder and doffer, at a surface speed of 60 to 80 feet per minute, with the drum grinding roll, and afterward increase the speed to normal and finish with the traverse roll grinders. In connection with grinding, while I am on this subject, I wish to emphasize the necessity of keeping the grinding rolls in first-class condition at all times, that is, a mill should not, for the sake of a system of so-called economy, neglect to change the emery filleting at frequent and regular intervals as needed, because this causes more poor grinding than anything I know of. Rolls should be covered with 40s grooved emery, and it should also be remembered that what is desired when grinding is a keen edge, and care should be taken to not fuse the wire by deep setting and grinding should continue long enough to secure a true, even surface.

There is a good deal of misunderstanding in regard to whether the terms "counts of wire" and the "points per square inch" are the same or not. There is no similarity between them because as a matter of fact the points per square inch are found by multiplying the English counts or wire by 5. Therefore, $120 \times 5 = 600$ points per square inch, and figuring that the cylinder is 50 inches in diameter and 40 inches wide, then we find that the cylinder contains:

$$50 \times 3.1416 \times 40 = 6{,}283.2 \text{ square inches}$$

Continuing, we find that $6{,}283.2 \times 600 = 3{,}769{,}920$ points in one circumference of cylinder, while $3{,}769{,}920 \times 165 = 622{,}036{,}800$ points per minute passing any given point on the cylinder when using 120s English counts, or 35s American, with a speed of 165 r.p.m.

A recognized authority states that approximately 13,750,000 licker-in teeth pass the feed rolls every minute, while on a medium weight lap running with the feed roll making 10 r.p.m., delivers to the licker-in, in the neighborhood of 13,750,000 or approximately one fiber per tooth. These figures may seem at first to be superfluous, but a little applied study along these lines will convince anyone of their practical value, as the writer, who is a practical man, can testify.

It is a very good plan to occasionally true up the grinding rolls, because if they are out of line it is quite certain that any card which has been ground by them will not produce good results. This may be done before re-covering with new filleting by taking the rolls down to the machine shop and placing them in a lathe which has previously been trued up with an indicator and truing-up bar. Then the rolls should be placed in the lathe and tested with an indicator, and if out of true a slight grinding may be necessary before being recovered. This may seem a whole lot of bother but the results will more than justify the trouble, because in this, as in a good many other things, the old adage holds true, "look after the small things and the big things will look after themselves." Lots of men will say, when the cylinders are in bad shape, first use the drum grinding rolls and then finish with the traverse rolls, but I say use drum grinding rolls only on flats, and traverse rolls only on cylinder and doffer.

One other point where great care should be used is in setting the stripping brushes, to see that they are not set too low so that they chafe the foundation of the card clothing, this having spoiled lots of card clothing.

Benjamin (Conn.)

More About Running Samples.

Editor Cotton:

On reading the June issue of Cotton, I became very much interested in the letter from "T. A. B." on running samples, and his statement that "too many cooks spoil the broth" brought to my mind an incident that occurred in a large eastern mill making fancy goods.

At that time many mills were changing over onto tire fabrics and were doing a tremendous business. So this mill, with which I was connected, decided to get in the swim and compete with the rest, and decided to run 5,000 pounds at the bale opener through into tire fabric, keeping an accurate account of loss in visible and invisible waste so that a computation of cost per pound to make the finished fabric could be found. It was reported that if they succeeded in their efforts, a large order was forthcoming at once.

Now instead of getting the boss carder's advice on running the sample through his department, the assistant superintendent, who by the way had been previously to this time an overseer of dressing, made out the organization he wished to run. He had the exact speeds of front rolls on the railways and drawing frames changed to suit his fancy.

The assistant superintendent desired someone to start with the sample and follow through the mill with it, keeping track of all the weights, etc., and the boss carder selected me, as he knew that I had been running imitation linen samples in another mill, along with a few cord and flat fabric samples for the tire trade—and I was given this duty.

The organization was given to me by the assistant superintendent just as he wished it run. On going through the requirements I noticed the twist for the slubbers and the succeeding frames was obviously very low. I brought this to the attention of the boss carder and he agreed with me, but we did not succeed in getting anything changed on paper and so proceeded to run the sample according to instructions.

We got the cotton on to the cards all right, and the next morning the assistant superintendent came around and said to me, "Push in the percentage plate, as there isn't enough strips coming off," and right then I saw why the twist was figured low. We finally got it through the combers and onto the slubbers, and then the fun began. The twist would not hold up the ends at all, but would the assistant superintendent change the twist? Not on your life! He thought the sample wouldn't go through fast

enough if he did; but it went through slower as it was.

The consequences were, when they got through to the dressing room with the yarn, out of the 5,000 pounds started there wasn't more than enough to make a decent cut of cloth. The order was lost and the sample was a failure, all through the assistant superintendent—who was not and never had been a carder—interfering with another fellow's department.

The mill tried to locate the blame, and it finally fell on the boss carder, a man of 40 years' experience, who had done his best to have the twist changed. Three weeks later the axe fell, and he lost his job. I left two months afterward, and since then I learned that the assistant superintendent was found out and was also fired.

Since that experience I have run a large number of samples, which came under my direct charge, and I made myself a promise that I would work for the least amount of waste that would have to be reworked, and produce a fine clean and strong sample that would attract trade. The production end would come the easiest of all later.

K. (Ohio)

To Increase the Breaking Strength.

EDITOR COTTON:

In further response to "Belting Duck" regarding the breaking strength of 6s and 8s yarn going into belting duck, and commenting upon the additional information given by him in the June number, I would say first that his cotton—⅞- to 1-inch staple—is all right for this work, if it is good, strong character cotton. North Georgia a few years ago produced a good, strong cotton, but from all reports they have drifted away from this character of cotton in the last few years and I might say, this is the trouble with all of the cotton grown in Georgia. The Georgia cotton does not compare with the western cotton in strength.

"Belting Duck" should have his cotton gone through by an experienced cotton grader, having the different staples and characters separated so that he can select a mixing, which should be thoroughly mixed on the floor before going to the automatic feeders.

His picking department seems all right, though I would prefer a three-blade beater in the breakers. The spiked or Kirschner beater is a good one if kept in good condition. The spikes in this beater will become bent and, of course, cannot do good work in this condition, but if they are kept in first-class shape and run at the right speed they will give good results.

I do not believe in beating the cotton too much, and would recommend 25 to 30 blows on the breakers and 50 to 60 blows on the finisher with two processes. This will give 75 to 90 blows per inch and I think this is sufficient. I would set the blade beater on the breaker ⅜ inch from the feed roll and the Kirschner ⅛ inch on the finisher. This may not appeal to some, but I have been getting good results with these settings. A 13½-ounce lap, as "Belting Duck" is running from his finisher picker, is a very nice weight to run for this class of work, but I would recommend a draft of 100 on the cards and also would make a lighter card sliver if possible. I would also lighten up on the drawing sliver. I would prefer a 55-grain card sliver, a 60-grain first drawing and 65-grain second drawing sliver; 45 to 48 hank slubber roving and 1.10 hank speeder roving.

Now it may be that "Belting Duck" is situated as many other men are—not having machinery sufficient to make the changes I have suggested. However, if he can do this, I believe it will help him some.

Just a few years ago breaking strength was not considered, and consequently when a duck mill was built it was with a view of production only. I remember very well a mill in which I worked where the boss carder told me that he had to card 300 pounds a day per card to keep up with the spinning, and everyone knows that it is impossible to do good carding under these conditions.

I have said nothing about card settings and do not think it necessary, as the best settings to use can be arrived at only by experimenting with several cards, running a sample through to the spinning and testing the break from each setting. The card settings will, of course, depend on the character and staple of the cotton.

Having arrived at the proper card settings, he should see that he has an even draft through the spinning, and that good rollers are used in roving and spinning. A rough or fluted roll should not be allowed to run, and all rollers should be properly weighted, cleaned and oiled. Travelers must not run too long, as they will wear sharp and cut the yarn. Spindles should be kept set true, if not this will cause the traveler to pull heavy, weakening the yarn.

Special attention should be given travelers on twisting. If a bronze traveler is used the heavy ply yarn will run in this and pull against the sharp edges. This certainly will weaken the yarn. The weights on the winders should be watched carefully, as too much weight will weaken the yarn. A good way to test this is to take a bobbin of yarn from the twisters and reel off a number of ends and break it, then wind off of some bobbin and break. I have seen a difference of 60 to 70 pounds in a test of this kind.

I do not know if any of these suggestions will be worth anything to "Belting Duck" and other readers, but I have found that it pays to watch the little things and I hope that this will be of some benefit. I will appreciate it if he will let us know through COTTON how he comes out with his breaking strength.

Superintendent (Ga.)

EDITOR COTTON:

In reading the letter from "Belting Duck" in the June number of COTTON, requesting a discussion on his lay-out, as given, for making 6s and 8s yarn for belting duck, I find that his lay-out is so nearly like my own, and his yarn sizes so nearly the same, that I will make some comments that may help him secure the breaking strength he desires.

I would first suggest that the spiked beater on his finisher lapper should by all means be a Kirschner carding beater. Our experience has been that such a beater running at about 1,000 r.p.m. will not injure the cotton fiber and will certainly give an excellent lap.

His finisher lap of 13½ ounces is the right weight, I think, but I do not believe that he is carding it enough. I would suggest that he make a 55-grain card sliver.

Aside from the changes suggested, all of "Belting Duck's" conditions are about the same as ours, and we have never had any complaint as to our breaking strength.

C. S. H. (Tex.)

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The Selling Power of a Good Letter

BY A. L. WHITE.

Two letters came in the same mail. One was written in a cold, formally courteous tone; the other had thrown into it by means of a carefully chosen use of words a warmth of friendliness and cordial courtesy by which the writer projected his own personality and made the letter represent, as nearly as cold print could do, what he would have said had he called. Now, other things being equal, which of those two letters would gain your business? Of course, in nine cases out of ten, the answer is the one in which personality is portrayed.

Personality in letter writing has a good effect in domestic business. It is even more important in foreign business where many of the customers are courteous to the point of punctiliousness. [illegible] is attitude of the foreign buyer is frequently overlooked by American exporters, as in the case of one who received a letter from a customer in Latin America, the closing paragraph of which was "I wish you a Very Happy and Prosperous New Year." In reply, the American merchant ended his letter merely with the words "Yours very truly." A man acquainted with South Americans suggested to the merchant the simple courtesy of adding to the letter "We thank you for your kind felicitations for the New Year and wish you the same." It was only a little thing, but it meant all the difference in the impression it conveyed between cold indifference and the attitude of friendliness which is so necessary in building up and holding trade with South Americans.

Great care in its correspondence is one of the important factors to which a large Chicago manufacturing firm attributes its phenomenal success in foreign fields during the past few years. This firm has all its foreign correspondence handled under the supervision of men of good education and experience, who are thoroughly familiar with the business and conversant with the languages of the countries in which the firm is doing business.

Letters, of course, cannot take the place of direct representation; nevertheless, they have their place—an important one—in all export business, and if properly used, may be a means of advertising, and certainly of holding business. For this reason, every manufacturer should carefully study this method of presenting his goods to his foreign customers. So far from doing this, however, usually manufacturers make the mistake of trying to economize either in the clerks who handle the foreign correspondence or in the translators. This is false economy, for money spent in training a good man to handle the foreign correspondence is a good investment which will bring back returns in orders. Personality is one of the first things to be taken into consideration when the manufacturer chooses a representative to go into the foreign field. This regard for the effect of the personal equation should be extended to all foreign correspondence.

In order to convince the customer of the firm's readiness to accommodate him, every effort should be made to put into all letters to him a cordial, friendly tone. Politeness, the personal touch, and attention to details are prime essentials. It is a strange fact that while often a salesman will spend hours on one prospect, sometimes the home office is so indifferent in the handling of foreign correspondence at the beginning of business relations that the prospect is alienated.

Frequently, too, the home office does not give enough thought and attention to a letter addressed to a prospective buyer to answer carefully and in detail the questions he has asked. In letters for business in the United States often it is unnecessary to make careful detailed descriptions of the goods. But in foreign business, such oversight may result as it did in the case of an Argentine manufacturer of bathtubs who sent an order for galvanized iron sheets to an exporter in the United States. When the sheets arrived in Buenos Aires, the customer refused to accept them, because he had expected "bright" sheets, and the exporter had sent "gray" sheets. Both buyer and seller acted in good faith, but that little detail of the description had been left out of the correspondence. In foreign business, a letter, which may perhaps travel for days or even weeks, should contain explicit information on all points about which the prospective recipient might need enlightenment.

The use of a different language also often creates some misunderstanding which would not occur in domestic business. In the matter of translations, many manufacturers display a surprisingingly short-sighted policy, often entrusting this important work to a poorly-paid clerk who has not sufficient general knowledge to handle it properly. A translator must be able to do more than merely to translate English words into the equivalent words of a foreign language. He must understand the idioms both of English and of the foreign language, and should have a thorough knowledge of the technical names used in the business. A man with such qualifications should receive good remuneration, for his position is responsible, inasmuch as a slight mistake in translation may render the firm ridiculous or cause expensive misunderstandings.

One other consideration in writing letters for foreign customers has been repeatedly emphasized by the United States consuls. This is the matter of the signature on the letter. Many firms send out trade letters with only the typewritten signature of the firm. The consul at Hankow, China, particularly called attention to this matter, stating that foreign merchants often construe it to mean that the American house sending such letter has no real interest in the possible sale of its goods abroad. One merchant told the consul that when he receives a sales letter from a United States firm, if the letter is signed personally, he always accords that firm the courtesy of a reply, but if a letter has no personal signature affixed, he throws it away. All sales letters should be signed, if not by the sales manager, then by someone with a title which will give weight to the communication, for the foreign customer must be impressed with the fact that his business is of great enough importance to the firm so that his correspondence will receive the attention compatible with his dignity.

After a customer has once been won, correspondence assumes a still more important role in holding him. Every business man knows the value of the right kind of follow-

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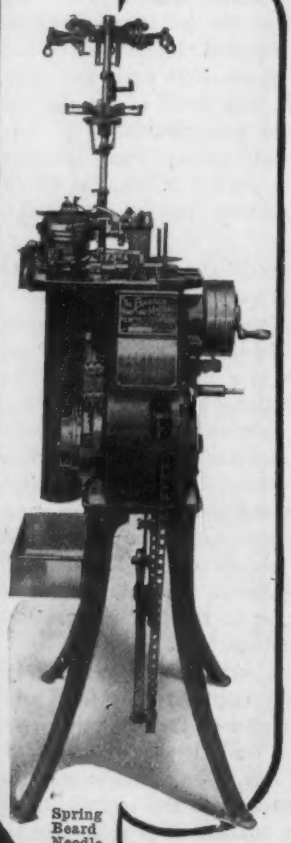

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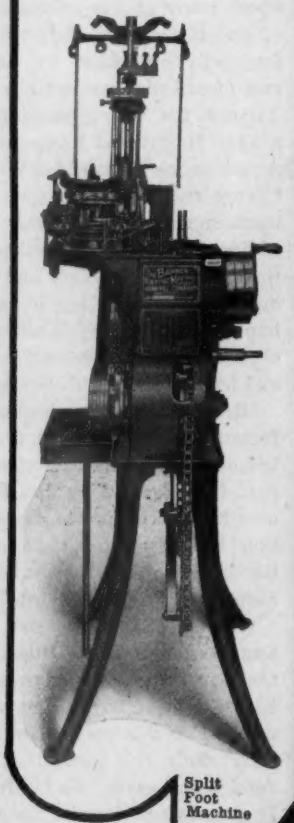


Split Foot Machine

HEMPHILL COMPANY

MAIN OFFICE AND FACTORY PAWTUCKET RHODE ISLAND

TRADE MARK

SOUTHERN OFFICE and SHOW ROOMS 912 James Bldg. CHATTANOOGA, TENN.

PHILADELPHIA OFFICE and SHOW ROOMS 208-9-10 COLONIAL TRUST BLDG. PHILADELPHIA, PA.

up letter. A firm which has built up a tremendous business in the manufacture of toys uses follow-up letters as one means of advertising, keeping in touch with its customers and apprising them of any new toys it puts out. In foreign business, manufacturers will find that carefully prepared follow-up letters will aid in sustaining friendly intercourse with the customer. Such letters also are of valuable assistance to the salesman in holding his trade together.

Correspondence, alone, cannot be depended upon to secure the business of any field, but it is of such great importance in gaining and holding customers that it deserves more consideration than it generally receives from the manufacturer who wishes to make a success in either foreign or domestic trade.

The Knit Goods Market

Scattered gains may be said to have been scored in the knit goods market during July. What was lacking in increased volume of sales was to a great extent compensated for in the breaking of the price jam. Prices of hosiery and underwear were advanced slightly, and jobbers who had declared they would not buy at prices higher than a year ago paid the advances on goods for which there was actual need, and there was some contracting of infants' socks and light weight underwear for next year at increases representing perhaps 50 per cent of the added cost of cotton yarns. Otherwise there was little buying for stock, as distributors persist in believing or affecting to believe that as the economic situation points in the direction of prewar prices, declines are to be expected.

While jobbers were insisting on values of July and August of a year ago they also were maintaining a stiff fight for longer terms, their minimum being 2 per cent in 10 days, with 60 days extra. They wanted 70 days in which to cash their invoices, notwithstanding manufacturers must pay for yarns on the 10th of the following month and disburse wages every two weeks at the utmost, many of them every week. Then when it came to buying Spring underwear for next year some of them wanted January dating on goods shipped out by mills in January. Thus mills would virtually be carrying them 100 days—doing that for which banking institutions are conducted.

The National Wholesale Dry Goods Association through its office in Philadelphia first launched the 2-10-60 extra campaign. What it has done since a committee conferred with a committee of the National Association of Hosiery and Underwear Manufacturers in May, when jobbers were given practically no encouragement, it is difficult to say, except that there has been recourse to the old game, that of playing one mill against another. A report will be broadcasted that such-and-such a manufacturer has yielded, and almost invariably the report is emphatically denied. In fact, not a single manufacturer has been found willing to say he has committed himself to terms more liberal than 2-10-30 net.

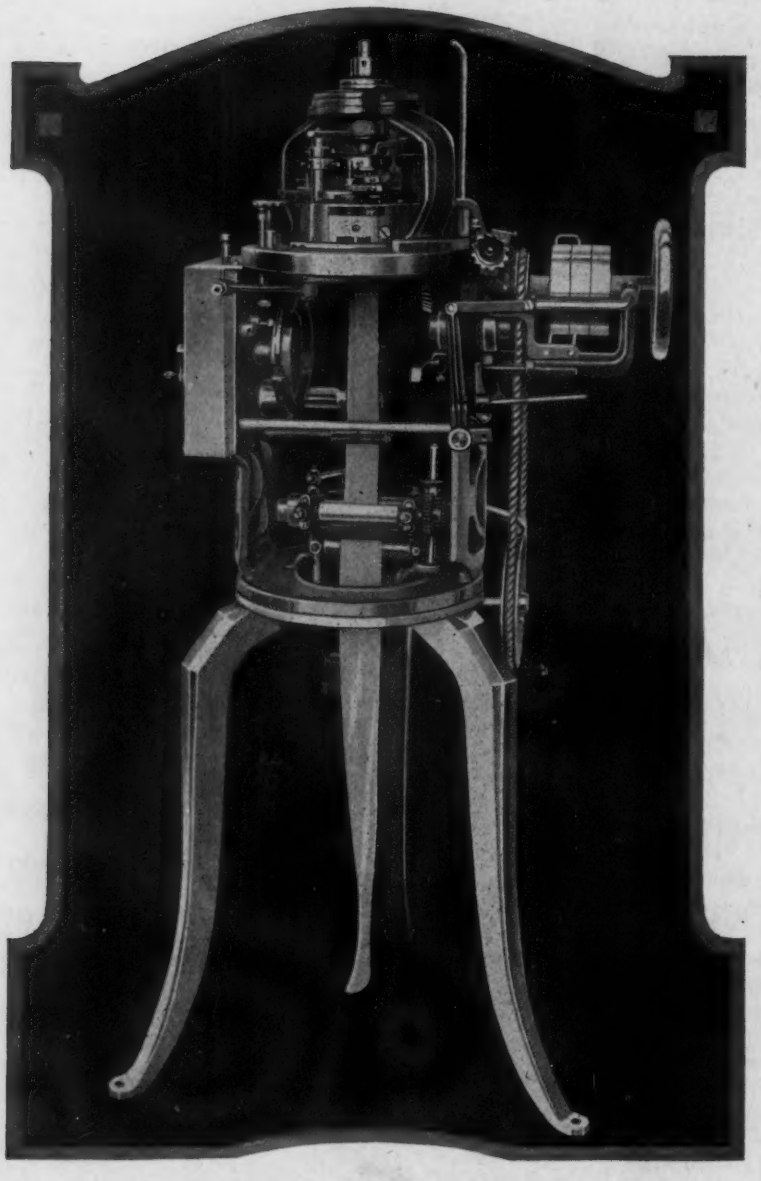
Now the Southern Wholesale Dry Goods Association, through a committee of which W. S. Ligon, of Ligon, Hinckle & Co., Petersburg, Va., is chairman, is prosecuting the work which was begun in May. Many letters from this committee have reached manufacturers and commission merchants, setting forth among other things the representation that the jobber is an economic link in the chain of distribution, a necessity to both retailer and manufacturer. The committee's letter follows:

> "With the established fact that the jobber is an economic link in the chain of distribution and is, therefore, a necessity both to the retailer and manufacturer, the jobber believes that in serving this capacity that conditions of contracts, terms, etc., should be made by the manufacturer that will bring about the maximum consumption. It is absolutely necessary, therefore, that the terms and deliveries meet the needs of the consumer.
>
> "Fall and Winter merchandise does not go into consumption until the beginning of October; Spring and Summer merchandise does not begin to go into consumption until April and later, and we believe that the most economic needs can be met through making deliveries and terms that will meet the ultimate consumer's requirements.
>
> "It is a recognized fact that credit is the basis of trade, and to bring about a maximum distribution of the products of your mills, it is necessary that the jobber be made terms of 2 per cent 10 days, 60 extra.
>
> "We think that it is timely that we call to your attention that since our principle source of wealth is mother earth, and that the crops planted in the early Fall and Spring months are not commercially available until Spring, and those planted in the Spring and Summer months are not commercially available until Fall, you can, therefore, appreciate that the principal source of the purchasing power of the consumer is about in line with the terms we are requesting, and which in our judgment should be granted.
>
> "Please be assured that it is our earnest desire to cooperate with you, realizing that our interests are mutual. We would especially like to impress upon you the fact that we approach you from a constructive point, and with the hope that our plea will enable us to better serve you."

Some of the manufacturers selling to jobbers do not subscribe to the view that the jobber is a necessity, pointing to the fact that many thousands of retailers for a long time have been and still are buying direct from mills, and that mills selling retailers direct have a quicker and larger turnover, relatively, than mills distributing through jobbers. Furthermore, it is contended, the manufacturer as a link in distribution is more important than the jobber—that he in the first analysis is the distributor of yarns and does not ask for nor can he obtain such terms as jobbers want. Then too, it is pointed out, the manufacturer often must borrow to pay for raw materials, and that it would be unfair if he also were left to borrow to carry in stock or on invoice the goods which the jobber buys. The straw that threatened to break the camel's back was the suggestion of January dating on December deliveries. In the plentitude of goods and the eagerness of manufacturers to keep mill help employed probably a mill here and there fell for the lure, so far as Spring underwear is concerned.

Next to the outspoken opposition to 2-10-60 extra voiced by Gustav Oberlaender, the executive head of the Berkshire Knitting Mills, the strongest utterance in antagonism comes from the southern manufacturer of hosiery, who sees in the move of the jobbers an effort to reduce the amount of the capital required to carry stock in the conduct of their business, and, as a sequence, forcing manufacturers to increase their capital. The longer terms, he points out, would encourage more persons to engage in business as distributors on a limited capital, increasing the manufacturer's financial risk. His idea of terms is 30 days as a maximum, the matter of discount to be left to individual manufacturers. For a number of years his mill has been selling its product 30 days net, goods being priced on that basis.

When cotton, Middling Gulf, was selling recently on the New York exchange at and around 22 cents, spot, a somewhat important jobber in a southern state was holding large quantities of cotton which had come to him from



WILDMAN
THE WORLD'S STANDARD

The *Wildman Ribbing Machines*

We have always tried to make Wildman Knitting Machinery not only a necessary part of the equipment of the hosiery manufacturer but a worth-while part in the development of the hosiery industry.

This has required foresight of two kinds—first, to visualize the requirements of the manufacturer—our customer:—second, the demands of the public—his customers.

As an item in the budget of progress, the Wildman Ribbing Machine deserves inclusion, for it increases production of better tops.

On request we will send the "Wildman Ribber Machine Catalogue" giving detailed il lustrations and descriptions of every important part of the machine.

TRADE MFG MARK

WILDMAN MFG. CO.

NORRISTOWN, PA.

retailers who could not take care of their maturing invoices in cash—he was doing precisely what a number of jobbers had done. "You see," he said, "I was compelled to take cotton in lieu of currency, and now must buy on long terms, as of course my funds are tied up in cotton."

"Why don't you sell your cotton?" he was asked.

"I do not believe I ought to sell just now," he replied, "as cotton is likely to go higher."

"Then you want manufacturers to sell you on 70 days in order that you may carry your cotton for a profit. It strikes me," the mill head who was a party to the conversation said, "that if you want to deal in cotton you ought to finance yourself or have a bank carry you."

Cotton just now is no more a speculative commodity than the manufactures thereof. If it proves to be worth more later, cotton goods then will be worth more than the trade is asked to pay for them. If cotton decline, cotton knit goods will go down with it. But cotton in warehouse cannot be disposed of by cancellation, while its manufacturers on order *can* be treated in that way, judging from the past, and it is predicted in the primary market that any sharp drop in cotton between now and January next would be followed by a flood of cancellations not unlike that which poured into mills in the early part of 1919 and again in 1920. Manufacturers who sold underwear in July for delivery in December and later, did so in the knowledge that the orders on their books were nothing more than an option held by dealers, the mills, however, being committed for deliveries in the event of a rise in the market.

The manufacturers of hosiery who have not received cancellations of orders every month this year are few. In the early Spring, orders which had been placed in December and January for hosiery of wool and silk in combination were cancelled in profusion. More recently hosiery orders have been cancelled. Most of the purchases of this class of goods are for at once delivery. "At once" is susceptible of two interpretations—one by the buyer, another by the seller. The latter has been led to believe that goods shipped out in 30 days come within the "at once" limitation. The distributor finds that the "at once" period may be made to expire in ten or twelve days. It is common for a jobber to wire or write a mill, "As the goods which we bought of you ten days ago for "at once" delivery have not been shipped, we herewith cancel order," and some buyers will add, "It will be useless to ship, as we will not take the goods, and could not pay for them if we did."

An underwear mill in the Central West passed into bankruptcy on July 1, after two years of struggling against adversity. The explanation given for the failure was, "In 1920 we suffered very heavy losses from cancellations and never have been able to recover."

Several months ago there disappeared from the directories of the knitting trades a large underwear mill in the East. An executive of that mill said two years and more ago, "The manufacturer who guarantees his prices against declines will go bankrupt." That mill did guarantee its prices, and it went the way of many another that indulged in the foolish practice and others still which took no steps for protecting themselves against losses by cancellation.

Trade absurdities flourish because sellers indulge buyers. As many failures, relatively, resulting from selling on long terms, will be reported in subsequent years, if manufacturers yield to the pleas of the 2-10-60 extra jobbers, as have been caused by cancellations and guaranteeing prices. Manufacturers have been slow to try to crush the evils against which they cry out while permitting others to get a foothold. Indulgence of these vicious practices may be ascribed to overproduction. Their continued indulgence is certain to bring about diminished production. Already the highways of industry are strewn with the debris of factories wrecked on the rocks of practices forced by buyers and fostered by sellers. Business will be the healthier when the factors that are dominated by their customers in an oversupplied market are removed.

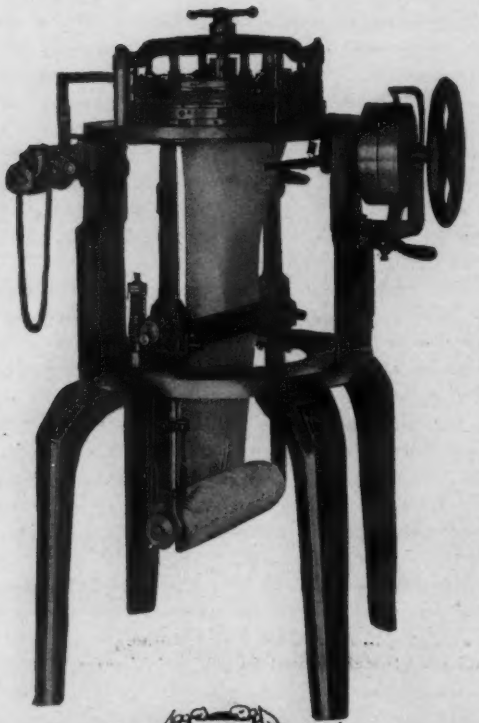
To some extent, it appears, the output of certain classes of low end cotton hosiery is more nearly balanced with consumption. Of the mills which in the last year or two have discontinued business, many were making the cheap cotton stockings for men and women. During July there were a number of large sales of low end hosiery, more particularly 176 needle carded goods. One commission house sold up for approximately two months its several mills, getting into a position in which orders for nearby delivery had to be declined. In fact, these mills, confident of the sustaining influence in the cotton market, were not stirring themselves for business calling for shipment this side of October. Chain stores and exporters were among the heavier buyers, in fact, chain stores, catalog houses and the five-and-ten stores stepped in while jobbers in the main were staying out.

In a single day in July there was sold for a large southern mill more cases of hosiery, of a variety of numbers than on any previous day in the mill's long history. And it may be said that on more than one occasion a day's sales amounted to more than 1,000 cases. Transactions of this character, however, have been the rare exception. The bulk of the business seemed to be going to a small minority of the mills, and the larger mills seem to have fared the better, probably because of their large production and lower overhead, which spelled the lowest possible price.

Low prices ruined one mill, as was developed shortly after it gave up the experiment of living on losses. This mill had sold a large quantity of low price hosiery to a jobber at 2½ cents a dozen under the best price which a larger manufacturer had found it possible to figure. This latter mill declined the jobber's order on a difference of 2½ cents a dozen. The other took it, but failed before the goods were put in process. Then the jobber returned to the mill which had stuck to its price, but by that time the goods there had gone up five cents a dozen. The jobber bought, paying 2½ cents more than he would have paid this mill had he bought when the order was first offered, and five cents more than he would have paid the mill which passed out of existence as the penalty for putting goods on the market at less than cost.

Two mills are making identical lines of boys' 3-pound ribbed stockings; one is paying two to four cents a dozen more for two mechanical operations, yet quotes fifteen cents a dozen less than the other. Obviously, one or the other is "off" in the matter of cost computation. Both will not be able to adhere to their respective quotations and remain long in business, unless one of them is endowed.

Some of the July hosiery advances which have stuck are 2½ to 5 cents a dozen on 144 and 176 needle socks and hosiery for ladies; 10 to 15 cents on mercerized half hose; 15 to 25 cents on ladies' mercerized, and 50 cents on ladies' wool stockings. Combed half hose are selling



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COUNTS in business as in everyday life. Our business career spans nearly half a century, and in that time we have established a reputation for fair-dealing and the building of dependable, durable machines for manufacturers of circular ribbed fabrics of all descriptions.

We claim for our machines simplicity, correct principles of construction, durability and excellence of workmanship.

Reputation—with half a century's time back of it.

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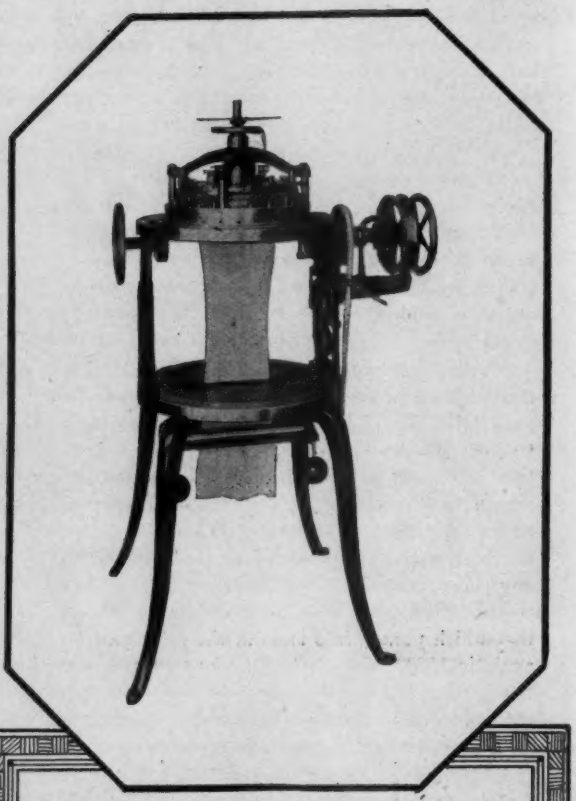

BRINTON BODY MACHINES

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Built in all sizes up to 24 inches. In all cuts up to 14 needles per inch.

You owe it to yourself to investigate this machine.

We also build all styles of Hosiery Ribbers and Knitters and various other circular machines for all kinds of knitted articles.

Samples, prices and particulars on request.

H. BRINTON COMPANY
Philadelphia Pennsylvania

at the prices of six months ago, and some mills have not advanced ladies' combed. One line of combed selling at $1.65 a dozen actually costs the mill $1.69, as shown by the most conservative cost figuring. But the line was due in the latter part of July for an advance, for the selling agents were advised by the manufacturer, "Present orders will consume all yarn in stock and on contract. Current prices of yarns show a loss on to-day's prices of hosiery."

Practically no hosiery has been sold or offered on the basis of 23-cent spot cotton or, to put it otherwise, on the basis of 34 cents for yarn, 10s single carded, so that, if cotton holds about where it was fluctuating during July, the real advances are yet to come. In fact, manufacturers whose prices are based on 30 cent yarn might be mentioned. One of two propositions seems reasonable: (1) Had manufacturers bought as tardily of yarns as jobbers did of goods, today's prices of the latter would be higher than any jobber has paid; or (2) had jobbers bought as freely on 18- to 20-cent cotton, as freely as normally, yarns would have advanced some weeks earlier.

Whether the jobber did or did not lack merchandising vision is a question which he himself may undertake to answer. But it may be said the manufacturer took a chance which the jobber was afraid to risk, and won, for both the mill and the distributor. In the matter alone of curbing price the manufacturer has proved himself more essential to the welfare of the jobber than has the latter as a link in the chain of distribution.

One industry that has been flourishing during the troublesome Summer market days is the rumor factory. A report which seems to have had its origin in the West was to the effect the Berkshire Knitting Mills had reduced the prices of their several numbers of full fashioned silk hosiery and that the mills were looking for business after having stated officially that the production for the remainder of the year had been sold. Emphatic denial is made of the statement that prices were reduced; in fact, raw silk is $1.50 a pound higher than when the mills named their prices for the last half of the year—prices which are no higher than last year at this date. "If any merchant believes we are not sold up for the year," said a spokesman for the company, "let him try to buy goods from us."

Prices of full fashioned silks have suffered some reduction, as is commonly known in the trade, but, with one or two exceptions, all the reductions were announced by jobbers; not by mills. One large mill did knock a dollar a dozen off the price of one of its numbers of ladies' silks, and another is selling silk half hose at 75 cents a dozen less than the price which some months ago was named for the season.

Jobbers started cutting full fashioned silk prices when a mill withdrew from the jobbing trade and began selling direct to retailers. In this instance, it may be stated, the mill price was above the market. With one other mill it enjoyed a practically complete monopoly of a line of clocked all-over silk hosiery for ladies. It went to retailers at only $2.50 a dozen less than the price jobbers had been paying. Of course this started something. Jobbers with this mill's product in stock at once proceeded to offer it to retailers at something less than the new mill price.

While silk hosiery is being worn more extensively than ever, there probably would be enough to go around if the production were less. Ingrain goods in particular seem to have come out in greater abundance than was necessary for taking care of demand, and the market at the end of July was by no means brisk.

Philadelphia full fashioned manufacturers note an increase in the number of idle knitters. Applications for work now are quite common, while a few months ago skilled knitters were so scarce that some mills had to boost their pay schedules, one at least paying $1.28 a dozen for legger work. This is 41 cents more than the 1920 peak. Full fashioned knitters who are in the class of adepts are drawing easily $100 to $112 a week. The dearth of knitters was due to the fact Philadelphia mills have been in the grip of the union, which was able to maintain restrictions as to the number of learners. Two western mills fought the union and won, and now are operating in peace, freed from the shackles of the autocrats of the knitting mill.

Seamless silk hosiery necessarily suffered some price disturbance by reason of jobbers unloading full fashioned, and it is stated that some sales in July were at the lowest prices of the year, notwithstanding at the time raw silk was about two dollars a pound higher than in December last. On the other hand, at least three seamless mills are being, and for some months have been, operated at capacity, one this year increasing its production by about 30 per cent. One of these mills is in New Jersey; two are in Philadelphia.

The executive of one of these exceptionally busy mills was asked to account for the activity in his establishment while so many were operating part time and, in some instances, receiving cancellations. "I do not try to account for conditions in other mills," he said; "I am content to know that we are sold up to August and customers are pushing for deliveries of goods which are a trifle past due. We make a good stocking of 12 thread silk, on 260 needle machines, get our price and are having a profit."

"Perhaps you sell on long terms?" the mill head was asked.

"On the contrary," he replied, "we sell only to what are known to be 10-day establishments. They may buy on 30 but discount in 10. In fact," he concluded, "we do not solicit business from any concern not believed by us to make a practice of cashing its invoices in 10 days."

Confirmation of the statement as to sold up conditions in this and one other mill is supplied by a manufacturer to whom some of tehir customer jobbers had complained of past due deliveries, and offered orders for enough hosiery to tide them over. This latter mill had suffered cancellation of several "at once" orders which had not been shipped inside of ten days and was unwilling to risk taking on any additional business for nearby.

In contrast with activity in the several mills referred to, and in others as well, there are a few big establishments in Class 1, Division A, which are in urgent need of business, and one which is closed down and has been for some weeks might be mentioned. The state of the market cannot be estimated from conditions in any one representative mill or group of mills, or by sales of any given line of hosiery.

With the trade inclining to the belief that solid black and brown will prevail as the popular colors of silk hosiery for Fall and Winter, there is some concern over heathers in silk and wool in combination. It is thought, however, that sports color mixtures will be very popular, and a brisk season in heathers is looked for. It is stated by worsted yarn interests that manufacturers having yarn in

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MERCERIZED YARNS

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EMPIRE BUILDING
PHILADELPHIA

ADAMS-FRANKLIN BUILDING
CHICAGO

MILLS
CHESTER, PA.

WESTAWAY BUILDING
HAMILTON, CANADA

twist and mixtures on order are calling for forward deliveries. One spinning establishment is reported shipping out an average of 2,500 pounds of yarn a day of this class.

In relation to yarn cost, infants' fancy socks are the lowest priced line of hosiery on the market. The leading mills making these socks opened for spring early in July, and in the first week one had sold approximately 75,000 dozens. Jobbers were taking about 80 per cent of their initial purchases of last year for the current season. Of two numbers of the Acorn line, one is 25 cents a dozen lower than a year ago and another is 10 cents down, from $1.75. Still another, at $2.35, is priced the same as last year, and, in fact, none of the numbers is any higher. The Romberger standard line is five cents a dozen higher, this taking care of about one-half the increase in the cost of yarn. Another manufacturer, whose prices of last year have not been moved up, says that having gone on the market there is nothing to do but reduce cost of manufacture, so that it is assumed his mill wages are due for a drop. One manufacturer, in order to keep prices down to a level indicated by jobbers as satisfactory to them, is understood to have lopped 15 per cent from his wage scales, and it is stated he has increased production without the employment of additional help. It would appear that in order to meet the jobber view of price, manufacturers have no alternative but to reduce mill help pay in proportion as the cost of raw material has been increased.

After a few conferences with buyers, warnings from jobbers that prices must not be advanced, and considerable jockeying, underwear for next Spring was put on sale in a sort of half-hearted way, at average advances of about five per cent over the 1921 July-August prices. Balbriggan shirts and drawers were rated at $3 to $3.35 a dozen, and cotton ribbed union suits were believed to have been priced the minimum at $7, an advance of 25 cents a dozen over a year ago.

Quite a number of buyers were in the market for the opening, and some bought a few goods. It did not appear that manufacturers really were pushing their lines. Cotton was in the neighborhood of 23 cents, with six weeks or more of weather with which to reckon, and jobbers figuring on values based on 18-cent cotton. Jobbers will take every dozen they bought if weather conditions during August do not make for a crop in excess of 11,000,000 bales, and will want more at present prices. Mills will advance their prices if the crop falls much short of that number of bales. Leaving "Ifs" out of consideration, the prices at which contracts were made, make it appear either that last year mills figured on substantial profits or will make next year's underwear at no profit to manufacturers, unless operating cost has been more radically reduced than it was believed it could be reduced.

An important jobber who apparently scented a rise in prices slipped into the market in the last week in June and bought 300 cases of men's underwear for next Spring, and paid an advance of 12½ cents a dozen over his last purchase for the current season. A few days later cotton took that jump of $7.50 a bale and the jobber wired for an additional 100 cases. The manufacturer also had heard of the movement of cotton to higher ground and had withdrawn the line from sale, and now the jobber must pay another advance of 12½ cents, a total of about two cents a

garment, which should make no difference in the price to the consumer. In fact, it is understood the jobbers have expressed a willingness to absorb 50 per cent of the increase, leaving it to retailers to take a profit of one cent a garment less.

This reckoning will not hold good in relation to wool and worsted underwear, of course. One line of men's union suits is up exactly 20 per cent in yarn cost and the yarn in another will cost approximately 30 per cent more. It is assumed in the jobbing trade that the per centum of increase on the finished goods will be less than on the yarn; that the mill either will shave operating cost or figure on going through the season with a less margin of profit than ordinarily a manufacturer with large capital investment is entitled to. The burden of the process of readjustment toward prices in line with the economic situation falls, as usual, on the mill.

Prices of practically all textile lines are too high, for one reason because the cost of distribution is too large. There are too many retailers and more jobbers than really are necessary as a link in the chain of economic distribution. Too many rentals have to be figured in the aggregate overhead in the cost of distributing to the consumer. Dealers are taking down as many dollars on a small individual volume of business as in the regular order of things they would lay aside from a large volume. There will be fewer retailers when the consumer no longer can pay fancy prices incident to maintaining three establishments where there were and ought to be only two.

Prices of some lines of underwear to be made up for next year no doubt were kept down by the fact there seems likely to be a considerable carryover of this year's goods, more particularly of ladies' low end vests and pants. Some of the Pennsylvania mills are idle, after operating for some time on part time, and most of the idle establishments have stocks of which they would like to dispose. This class of manufacturers was disappointed in the season's business. Dealers carried none of last year's goods into this year and it was expected they would buy about as they did normally. By the time they had sold their initial purchases they were ready to batter prices, and in doing this they bought so lightly that mills were left with stocks, and the distribution season drawing to a close. Notwithstanding the excess of underwear stocks in a number of Pennsylvania underwear mills, six new mills have been or, within the year, will be established. A few more additions of this character ought to operate to the very great advantage of the jobber seeking lower values, in his solicititude for the consumer.

While the jobbers were shopping around in the light weight underwear market they almost totally neglected heavy weights, of which, according to estimates of buyers and mill heads, there remains to be contracted for about 50 per cent of last year's requirements. Some jobbers have yet to make their initial purchases for next Winter, it is stated by manufacturers, and several have said they feel quite certain they can buy all the underwear in September that will be needed. They assume mills have overproduced and will continue in operation to the end of the season, regardless of the extent to which buying may be restricted. The July leap in cotton apparently created not the slightest alarm in jobbing circles.

The southern mills making the lower priced lines of Winter underwear have had the better end of the season's business. They put out low prices and offered their goods before many of the northern mills were ready to show samples.

It seems a reasonably safe prediction that Winter underwear bought in September will cost jobbers more than jobbers have paid to date this year.

Some Suggestions Worth Noting.

American knit goods manufacturers are in a way responsible for the present scarcity of experienced and competent operators of knitting machines, by failing to develop and train their own operators and by employing knitters away from other plants, it was brought out by Max Nydegger, of the Grosser Knitting Machine Co., in an interview appearing in a recent issue of the *Daily News Record*. Mr. Nydegger deplored the present practices of the industry in this respect, declaring also that this policy has resulted in the abnormal wages now in certain sections of industry.

"The shortsightedness of this policy," said Mr. Nydegger, "is daily making itself more apparent in both the scarcity of operators and in the abnormally and unnecessarily high wages that are being paid today to men who can operate and set up machines. A really good operator should earn in the neighborhood of $60 per week, whereas under the present system of 'grabbing up' competitors' men, these operators are now being paid from $80 to $150 per week, the higher scale being the more frequent. This all mitigates against the price of the finished article, as well as limiting production due to the lack of a proper force of operators. This condition is true of practically the entire country, with the exception of a certain group of knitters in Cleveland, who some years back brought over operators and have managed to hold them, as well as develop others."

In his statement, Mr. Nydegger also referred to the "inefficient and careless manner in which knitting plants, especially in the metropolitan district, have been laid out —if they can be called 'laid out,'" declaring this to be "another bad feature of the knitting industry."

"Machines are placed with absolutely no thought given to their proper location as regards light, air, and interior traffic in the mill," continued Mr. Nydegger. "In fact, in most cases, the entire problem of ventilation and illumination has been totally disregarded. The general practice in lighting seeming to be that whenever a light is needed, to hang a drop-light over that particular spot, this practice resulting in a few brilliantly illuminated small areas, with the rest of the mill in shadows. As for ventilation and the problem of handling work from one department to another, an efficient system to cover both these conditions has been entirely disregarded.

Mr. Nydegger expressed it as his opinion that if intelligent consideration was given to the foregoing conditions, about 50 per cent of the waste in knitting mills should be eliminated and the manufacturers would be getting full returns for their investments, and machines could show in actual dollars and cents what they are worth. He further expressed the hope "that the day is not far distant when knit goods manufacturers, especially the smaller ones, will realize the prime importance of having competent engineers or architects or really good practical mill men lay out their shops, instead of adopting the present happy-go-lucky hit or miss method."

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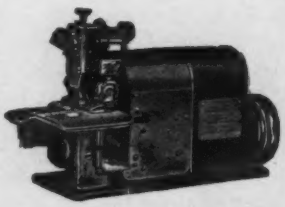

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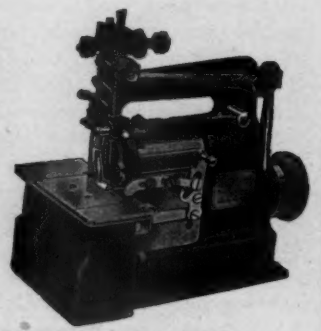

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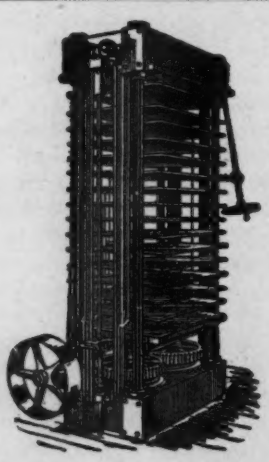

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Among the Knitting Mills

Oakbrook Hosiery Mills, Reading, Pa., will build a one-story stucco annex, 120x130 feet to the present plant, at a cost of about $20,000.

The Allen Locke Co., Philadelphia, will construct a one-story building to be equipped as a hosiery mill.

With a capital of $15,000, the Household Hosiery Mills, Chattanooga, Tenn., has been incorporated. J. C. Miller, C. E. Clift, L. T. Wilkerson, John B. Hyde and W. E. Wilkerson are the incorporators. The company plans to manufacture hosiery for direct sale to consumers, specializing in silks.

The Yale Knitting Co., Malden, Mass., has purchased a one-half acre tract of land adjoining their present plant, on which they will build another mill. The new addition will enable the company to triple its production.

The Honor-Knit Knitting Mills, Inc., will continue the operation of the Mason Knitting Mills plant at Blackwood, N. J. The equipment has recently been increased to 44 knitting machines and four sewing machines and four clocking machines. The product of the plant now is women's seamless and mock seam hosiery in silk, silk and worsted, mercerized cotton, etc.

Charlotte (N. C.) Knitting Company has installed additional Banner knitting machines and supplementary equipment to secure production of from 200 to 250 dozen women's artificial silk hose in addition to its former production of 350 dozen half hose.

The Globe Knitting Mills, recently removed to North Philip Street, Philadelphia, have installed additional machinery consisting of 50 Brinton necktie machines; 10 Jarvis double rib machines. This will give them a production of 4,000 dozen per week of grenadine and circular neckties.

The Century Knitting Company, Pottstown, Pa., has started work on a $100,000 annex and bleachery, 60x140 feet.

In connection with the doubling of the capacity of their plant, it is understood the Texas Hosiery Mills, at Dallas, Texas, will install equipment for manufacturing men's half hose and will also erect a dyeing and finishing plant.

Probably the latest knitting mill to get into the ranks of direct-to-retailer organizations is the Henry Lehmuth Co., Ontario and D Streets, Philadelphia, Pa., manufacturers of ladies' lace clocked full fashioned silk hosiery. It was authoritatively announced recently that in future the mills output will be distributed through Rubens & Meyer, 315 Fourth Avenue, New York City, thus freeing the mill from the necessity of organizing a selling force, while putting the product into a house distributing complete lines of hosiery.

Plants of the Richmond Spinning Company and the Chickamauga Knitting Mills, Chattanooga, Tenn., closed down for two weeks, during July. Several reasons for the action were given by T. N. Van Dyke, treasurer and general manager of the two companies. It was decided this would be a good time to take inventory and make needed repairs, especially since the strike of railroad shopmen demoralized freight service in that vicinity.

A brick and concrete addition, six stories, 65x66 feet, is being built by the Holeproof Hosiery Co., at Milwaukee, Wis. The building will cost in the neighborhood of $40,000.

The new brick and concrete warehouse adjoining the plant of the Jersild Knitting Co., Neenah, Wis., has been completed and is now in use. The addition is a two-story building, approximately 120x60 feet, and will be used for the storing of finished stock. Officers of the Jersild Knitting Co. are: President, Georgia Madson; vice-president, Gustav Kalfahs; secretary, E. E. Jandrey, and general manager-treasurer, L. J. Pinkerton.

The Navy Knitting Mills, 236 Fifth Avenue, New York, N. Y., has filed notice of increase in capital from $200,000 to $500,000, for proposed expansion.

The Kaufman-Rohrlich Knitting Mills, New York, have been organized with a capital of $10,000, to manufacture knit goods. A local plant will be operated. The company is headed by J. D. Rohrlich, I. and M. Kaufman, 161 Broadway.

The Miller Knitting Mills, Shenandoah, Pa., has work under way on a new five-story mill, 45x100 feet, estimated to cost in excess of $75,000.

The Leo Brown Co., New York, N. Y., recently organized with a capital of $20,000, will operate a local plant for the manufacture of sweaters and other knit goods. The company is headed by M. S. Marwur and I. Stahl.

The Markiknit Sweater Mills, Inc., Brooklyn, N. Y., has arranged for a change in name to the Mari-Sport Wear Corporation.

The Feiners Knitting Mills, Inc., New York, N. Y., has been organized with a capital of $200,000, to operate a local mill. The company is headed by J. Schwartz and M. Olesker.

The Acme Knitting Co., Newark, N. J., has been incorporated with a capital of $25,000, to manufacture knit goods. A local mill will be operated. The company is headed by Samuel Cohen, Nathan Segal and Samuel Herman, 790 Broad Street.

The Martin Knit Fabric Co., Brooklyn, N. Y., has been organized with a capital of $15,000, to manufacture knit goods. The company is headed by M. H. and N. K. Skalatsky.

The Shellburn Knitting Mills, Inc., New York, N. Y., has been organized to operate a local plant for the manufacture of sweaters and other knit goods. The company is headed by M. H. Muller.

The Washington Sportwear Mills, Inc., 141 Wooster Street, New York, has filed notice of increase in capital from $7,500 to $25,000, for proposed expansion.

Exports of artificial silk and silk hosiery in May totaled 129,867 dozens valued at $565,208, of which total 57,283 dozens with a value of $260,571 went to England, it was announced in July by the Bureau of Foreign and Domestic Commerce. A total of 35,652 dozen of silk hosiery valued at $305,035 were also exported in May, England again taking the largest number, 10,890 dozen valued at $93,857. Canada, Mexico, Argentina, Australia and British South Africa were also large markets for hosiery from America during this month.

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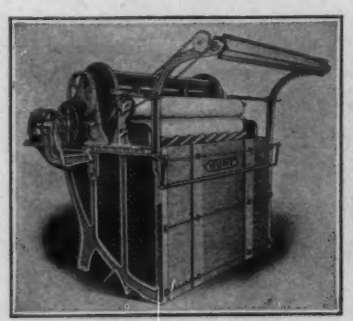

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The Yarn Market

Taken as a whole, and considering the entire period, it can be said that the Philadelphia cotton yarn market during the past month was in a better condition in regard to prices and demand. During the period yarn quotations were noted to follow, in a general way, the fluctuations taking place in the raw cotton market. Yarns started the month off rather weak, but acquired strength with the passing of the days and at this writing they appear to be on a firmer footing than that existing in the month of June. As has been recorded here, yarn rates, for the past several months, and because of conditions that have been pointed out from time to time, have been on the upgrade, continued increases developing until middle July saw quotations on a basis from 25 to 30 per cent higher than those prevailing two and a half months previous, on May 1. This refers to the carded weaving and knitting counts, and the carded section of the list as a whole stood at its highest price level in nearly two years.

The first week of the month being reported here saw a number of important yarn price gains which were attributed to the higher values in raw cotton coming about that time. Combed peeler yarns increased about 5 cents a pound during the first half of the week, and in the latter end of the week smaller advances were reported on coarser counts of two-ply carded skeins and single carded cones.

The first notable downward reaction in rates featured the second week in this market. This affected generally all the carded single and two-ply skeins, warps and tubes, and approximated an average loss of a full cent a pound. This was directly attributed to the liquidation in raw cotton at that time, as well as being influenced by a determination on the part of the consumers to buy cautiously.

It was true, however, that in the face of this decline, there was quite a buying spurt during the latter part of June, said to be mainly effective in knitting yarns, demand for these yarns being credited to a sudden expansion of export business in underwear. It was noticeable also, however, that weaving yarns were in some demand, this probably being the result of a desire on the part of the weavers to replenish stocks ahead for a month or so.

The drop in prices mentioned was recovered in early July, and while being far from a stabilized condition, yarns showed indisputable evidences of increased quotations, although at the time accurate price quotations were unavailable. Speaking for the list in general, however, the average increase was probably one cent a pound. The prices regained at this time seemed to hold up well the remainder of the month.

With varying attitudes and opinions in regard to what the future holds and does not hold for cotton yarns, business during the past month would hardly be considered anything to rave about especially, that is, so far as total volume is concerned and considering the entire market. As a whole, buyers were not exactly clamoring for yarns, and the opinion that seemed to be held by a majority was that they would stay out of the market waiting for lower prices, which, according to some factors, seemed certain to be around the corner. On the other hand, experienced factors expressed the opinion that while the prices now current are relatively high, at the same time, their influence will not be sufficient to prevent an increasing volume of business, and one prediction was that the next three months will see a greater amount of business handled than during the past nine months. It was also intimated that the conditions now prevailing are such as to require only a moderate amount of business to cause still further price advances, and in this connection it is pointed out that most spinners have by this time certainly used up practically all the comparatively low priced cotton, and also that while there may be some stocks of yarn on hand, these supplies surely are not as great as they were, nor as numerous as is supposed by other factors.

Following are quotations for the Philadelphia market on July 15:

Single Skeins.

4s to 8s	34½	10s	35½
12s	36	14s	36½
16s	38	20s	39
24s	40	26s	41
30s	43		

Single Warps.

8s	35	10s	36½
12s	37	14s	37½
16s	38	20s	39
26s	41½	30s	45
40s	56 @58		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	35 @36
8-2-3 tinged tubes	32
8-3-4 hard white warp-twist	35 @35½
8-3-4 hard twist waste	31

Two-Ply Skeins.

8s	35	10s	36
12s	36½	14s	37
16s	37½	20s	39
24s	40	26s	42
30s	44 @45	40s	56 @58

Two Ply Warps.

8s	35	10s	36½
12s	37½	14s	38
16s	38½	20s	40
24s	42	26s	43
30s	45 @47	40s	58 @59

Two Ply Combed Peeler Skeins and Warps.

8s	55	16s	55
20s	57	24s	60
30s	62 @65	40s	75 @80
50s	85 @90	60s	$1.00@$1.05
70s	$1.10@$1.15	80s	$1.20@$1.25

Frame Spun Carded Yarn on Cones.

8s	34½	10s	35
12s	36	14s	36½
16s	37	18s	37½
20s	38½	22s	39
24s	40	26s	42
30s	44	40s	56 @58
30s double carded			47@48
30s tying-in			40@42

Mule Spun Carded Yarn.

10s	38	12s	38½
14s	39½	16s	40
18s	42	20s	43
24s	44 @45	26s	45 @47
30s	49 @50	40s	59 @61

Mule Spun Combed Peeler Yarns.

10s	49	12s	50
14s	51	16s	53
18s	54	20s	56
22s	58	26s	62
28s	66	38s	79
36s	78	38s	79
40s	83 @86		

An office of the Bureau of Foreign and Domestic Commerce has been opened in the Chamber of Commerce Building, Atlanta, Ga. B. C. Getsinger is in charge of this office, the purpose of which will be to assist manufacturers of this section in the further extension and development of trade with foreign countries, particularly in South America and the Latin-American countries. The opening of this office is the first time the Bureau has had direct representation in the Atlanta district since the closing of a similar office under the direction of W. A. Graham Clark, a number of years ago, and is now the only office of the Bureau between Washington and New Orleans.

The pulse of business, while stronger, still indicates a slight need for stimulant.

The Distribution and Use of Wealth

BY H. D. FETZER.

Wealth is property accumulated by judicious or shrewd management, and consists in everything reducible to standard money. Money is, therefore, the substance of past labors of hand or head on the part of some one. Its source is threefold: inheritance, personal effort and lucky finds by unforeseen chance. Inheritance goes entirely to the credit of thrifty ancestry. Personal effort covers the broad field of endeavor in the thousand and one channels of modern research and commercial activity. It has to do with everything from grandmother's harmless medicine brew to the latest radium treatment; from the most primitive country blacksmith's iron wedge to the wonders of Edison's laboratory; from the rattling pennies of the peanut vender to the billions of Wall Street; and from the rough river raft to the floating ocean castle; and even from the modest home truck patch to the towering elevators and store-house—say, just any and everything. The lucky find by unforeseen chance has made several millionaires. A poor farmer takes up a homestead entry, when, later, two trunk lines of railroad cross the farm and each other. Business men see the opportunity, insist on a location, buy at any price; others come likewise, a town or city rapidly grows, and the poor farmer is a millionaire. Another makes a gold find on his old farm. Another finds he lives over ponds of subterranean oil. Another discovers new processes on the grosser metals; another makes automobiles; another airplanes, and we have more millionaires. Work, research, discovery, money—and here we go, lucky and honest, harming no mortal man.

Then, have all mortals an equal chance on Fortune's playground and in her workshop? Essentially, yes—but naturally, no. Chance is open alike to all, but all are not endowed alike with the finding faculty. Hence the rich, the well-to-do, and the poor subdivisions of man. We may say it is not the fault of the civil law, generally speaking; it is not the fault of the man, for he did not create himself.

Let us take a bird's-eye view of the matter and take testimony on how this thing always has been, is now, and doubtless will be down to the crack of doom. With all this outcry of our day, we need to counsel with each other, formulate sound opinions, and stick to them for humanity's good. We all are naturally just like we are, and while we can cultivate here and restrain there, we cannot add one cubit to our stature, nor change the leopard's spots.

If you remember history, from the beginning to the present, sacred and profane, you will know that there never was a time when wealth was any more evenly distributed than now—that there have always been pre-eminently rich men, and that they were used by Divine Providence in the most momentous transactions between earth and heaven—God in history, humanity the beneficiary. This needs no proof, for the statement is accepted by all studious people of intelligence, and nothing that is not tangible can be proven to others.

Make a note of these illustrious examples: Noah was rich beyond all compare in his time, else he never could have built the ark in the face of public opposition that must have been unanimous, but he was God's very special representative in that universal flood. Solomon prayed for wisdom, and not for wealth, but was given both by the God of all nations, else the temple had not existed and a vast block of history left unwritten. Job, from the land of Uz, was the greatest of all the men of the East, and the richest, but was one of the poets of sacred writ. The accumulated wealth of Abraham, Isaac and Jacob has never been computed in money—it was colossal, but they were the chosen ancestry of God's people of Israel. The New Testament makes mention of a number of rich men who were highly approved for being a power for good in the land—all except two: he that built larger barns in the rank assumption of his self-sufficiency, and he that was unrighteous and selfish through and through.

The oft-quoted passage about the camel and the needle's eye, as related to the rich man and the Kingdom of Heaven, is usually understood in error, for it does not condemn the possession of riches, but the engrossing love and consuming care of them. The plain fact is that the righteous rich man always has been and is now the greatest man of all the land for good, for peace, for order, the mainstay of the governments, and the special object of God's blessings and love.

Of the rich Greeks we mention Croesus of fame, and of Egypt the Pharaohs, for memorable wealth and permanent public service. Estimate, if you can, what the pyramids would cost us to build now, if indeed we could build them at all. They are no use, you say? As much use as the memorials we build to our military heroes, and more. Of China, name the dynasties that built, for public good and protection, the great northern walls of their country, fencing out the terrible Tartar. Their cost would construct five trunk lines of railroad from the Atlantic to the Pacific. There are other examples. These men's lives and works bear diligent study, for they, by virtue of their wealth, have written many outstanding chapters of humanity's history, and left us the time-proof monuments to past greatness, wealth and civilizations.

Later the rich feudal lords of the Middle Ages carried the waning civilization of all nations, and the Scriptures, through the fright-stricken channels of the Dark Ages, down to the light of reviving modern times. I dare say there is nothing bad in that alone, and even if some necessary hardships were put upon a faulty populace, they doubtless were for the public good in those times, viewed from any angle it was the major service possible to be rendered to humanity by these rich lords.

The point I am hauling through the ages down to our modern eyesight is the fact that the rich men of history come to us with shining records as the salt of the earth, and there is no gainsaying, for they have done practically all the heavy work in the betterment of the human family, setting aside the one fact of the Divine Jesus of Nazareth, who had no where to lay his head.

When we take a view of our own times we find a new feature in the distribution and use of wealth. While but a small percentage of the total population, it is nevertheless a multitude who have become rich in property, most of whom are good and righteous men; a small minority, however, being bad enough, and they cause this outcry

against massed wealth, and thereby the condemnation of many of our best citizens. This results from the crime of making unfair advantages by legislation involving special taxes upon the people, for any line of private endeavor. For instance, we have a few wealthy citizens in Pittsburgh, made so by a tariff on trace-chains, and so unwisely administered that the government never got a cent of revenue, but every time a farmer bought a pair of trace-chains, and about a million pair are bought annually, he made a cash present of thirty cents to the Pittsburgh manufacturer, and when, after a few years, the farmer got wise and mad, he condemned all tariffs, while, in fact, we must have tariffs, honestly administered, for revenue. But it had already done the mischief of raising an outcry against the rich indiscriminately. Punch called up the devil, but has never been able to call him down since, and the outcry goes on in various menacing ways.

Many similar cases could be cited, all bearing the same lesson. The crime and the danger are obvious, for the one word that defines human nature is the word selfishness, and hence the tenth commandment of the decalogue. It must be dealt with in economics, by lawmakers, and by courts, and even in the neighborhood and in the family, and surely in our industries, for it is an all-abiding factor. The American opinion in the rank and file of people is still tinged with the nearly even distribution of wealth, or rather the lack of it, after the American revolution, when there were no millionaires, when the open land was open to all with equal rights and with special privileges to none. That was the American idea until recent years, and now the whole mass of people is falling into fragments, and every fragment organizing against the others, for some sort of unfair advantage. Not long ago it was almost confined to larger manufacturers, but now it pervades every line of human endeavor in country and city, and what it will culminate in is mystifying in the extreme. But this I know, that mutual confidence is the foundation rock of a republic, and if there is no mutual confidence, then what?

The daddy and mammy of the modern strike are selfishness and wastefulness, with common greed for a goad, and the lack of business sense for an impelling force. Opportunity sets this breedery into rapid action, which current events demonstrate to a finish.

Let us revert to the civil law part of the Mosaic law for light, and incidentally for a reason for much of the outcry of our day against great wealth. This code had the provision that every fiftieth year (the Jubilee) all property gotten "under the sheriff's hammer" reverted to the original owner or his heirs, automatically, the purpose being to put bounds to growing fortunes, unless full value had been paid for them. There is no law in all the law books of all the nations that compares in wisdom with that provision, for it took wealth-getting out of the gambling class of endeavor, and its fairness made for public contentment and the peace of the land.

We have already noted an instance of the tariff wrongfully applied, but the cases of unfair advantage are much more numerous in the open market on misfortune's sale-block. Note an instance to illustrate that class of transactions: Years ago I witnessed an unfinished railroad selling under the sheriff's hammer at fifteen cents on the dollar, because of a disappointment the initial company experienced in securing the funds arranged for at the start. The purchasers completed the road easily and have since made millions, because the road's terminal was at a now famous city. In other words, the man who handled this deal made big wealth on a basis of labor and capital he never paid for, though one hundred per cent investment was necessary for the project. Doubtless we have a defect in law here, enabling large fortunes to be amassed, while causing bitter complaint from those who are utterly ruined in the process under the guise of a legal transaction. Other instances might be cited where money lenders foreclose mortgages on homes nearly paid for causing a total loss to the struggling citizen or bereaved family.

The fact is, dollars are not of equal value. For one dollar in the hands of a wealthy man is a hundred times more potent in the traffic world than the poor man's lonesome one dollar, and here lies the one great secret of modern wealth-building. The civil law sanctions and even directs such transactions, and they are therefore lawful, but they illustrate modern superficiality in not being just. However, most of the fortunes of our countrymen are not on such a precarious foundation, but were made in legitimate manufactures with just profits.

Hundreds of noble cases of rich men's philanthropy might be cited, and only a part of them on a charity basis. When Vanderbilt put up Biltmore it was a clean-cut case of distributing his millions among the people and taking Biltmore as an equivalent. The castle would be of no more value to the average citizen than a six-room cottage, but he was satisfied, to the infinite helpfulness to a wide range of country.

Witness the rich come forward and buy the bonds of the government when it was in need of money to function in times of crises. It is the essence of patriotism even though they draw a modest rate of interest. But when the crises are over and the country saved, these benefactors are immediately and derisively called bloated bondholders for thanks from the selfish, senseless, socialistic crowd.

In regard to the many enterprises wherein a body of wealthy men combine their surplus capital to found new industrial plants, what is it but a public benefaction that they should accept such structures and equipments as an equivalent for vast sums of money disbursed among a wide range of laborers and mechanics, and later, when the product begins to come from that enterprise, that they again should distribute the income among another large number of laborers, less a small per cent reserved to reimburse them gradually for the original outlay?

I am only a modest home owner, but I can easily recognize the indispensable necessity of wealthy men to the government and the people. In fact the great majority of our people would be in a hopeless condition without them, for they come forward and solve our hardest economic problems, namely, nature's first requirements—our physical wants—through the means of profitable labor and credits. Put a people in the right moral conception of the relations between labor and capital, then it is possible to keep them busy at contented and profitable labor, and it is likewise possible to save the country in spite of demagogues, politicians, or fanatics.

But the overwhelming evidence before us from all records is that the rich men of the earth, setting aside the occasional Judas Iscariots interwoven in history and in our own times, have been its main factors for good and the mass of people their beneficiaries. This is still true,

notwithstanding the unholy outcry of labor agitators, whose only stock in hand is a total misconception of the things that are right or wrong, coveting the things that are the rich man's in violation of God's commands. Their crime to society, the government, and the peace of the land, makes them culprits of black guilt before the bar of justice and of public opinion.

Wars do not originate in politics, nor in civil law, nor in government, but only when just values in relation to cash money are being disturbed by some untenable proposition that the sane business world cannot and will not accept. That describes the revolutionary way, the British, the Mexican, the civil, the Spanish, and the world wars, and it describes also the next war, short-sighted labor being the immediate provocation, higher moral and patriotic considerations usually being attendant factors in such conflicts.

The everlasting truths of the God of all nations will prevail, and there will be no escape from that final judgment: "The curse of the Lord is in the house of the wicked, but he blesseth the habitation of the just," for it is true and faileth not, sooner or later, alike to the rich and to the poor.

Smith & Furbush Merge with Proctor & Schwartz.

A recent announcement of general interest is that the Smith & Furbush Machine Company, builders of carding and preparatory machinery, garnetts, shoddy and waste equipment, now at Hancock and Somerset Streets, Philadelphia, and the Proctor & Schwartz, Inc., builders of Proctor drying machinery, Seventh and Tabor Road, Philadelphia, have merged their plants and businesses under the name of Proctor & Schwartz, Inc. The capital investment of the combined organization will be $2,500,000.

As has been generally known for several years, Proctor & Schwartz, Inc., has a controlling interest in Smith & Furbush Machine Company. Both businesses were formerly operated at Hancock and Somerset Streets, but the growth of the concerns required considerable additional space, so that Proctor & Schwartz, Inc., built a new plant at Seventh and Tabor Road some three or four years ago.

In connection with the announcement of the merger, it is stated that the increase in the demand for the product of Smith & Furbush Machine Company now makes their building at Hancock and Somerset Streets inadequate to handle the volume of business offered, and as the Proctor & Schwartz plant has ample space available at Seventh and Tabor Road, it has been decided to extend the buildings there sufficiently to cover the requirements of Smith and Furbush. This extension to the building will cost in the neighborhood of $100,000. As the combined business will then all be under one roof, it is deemed advisable to merge the organizations, as well as the factories, under the name of Proctor & Schwartz, Inc.

When the extensions now being made are completed, the buildings will cover the entire plot of 8⅝ acres at Seventh and Tabor Road. The main manufacturing building will be 240 feet by 575 feet, one story, of reinforced concrete, with saw-tooth roof, daylight construction. It will be equipped with the latest tools and fixtures, craneways and other modern aids to efficient operation. In addition to the 138,000 square feet contained in this building, there will be approximately 95,000 square feet in the other buildings—a four-story building housing the research and other departments, the wood working building, power house and the three-story and basement office building, making a total for the plant of about 223,000 square feet of floor space.

With the advantage of the greater resources and improved facilities offered by the larger and more modern plant, and the benefit of the research and experimental departments, the organization expects that many new developments and improvements to their products can be made. The policy of the organization will be to furnish the best machinery possible to make in the finest equipped plant of its kind, and to back up the product with the finest kind of service to the customer.

The sale and manufacture of the respective products will be under the supervision of the same executives who formerly managed the separate companies. The officers of the combined organization will be Walter M. Schwartz, president; E. B. Ayres, Frederick Kershaw, Thomas W. Allen and Herbert T. Hershey, vice-presidents; and Frank E. Schermerhorn, secretary and treasurer.

The actual merger will take place as soon as additional facilities are available, probably some time during the Fall.

The Smith & Furbush Machine Company is one of the concerns that were honored recently by the Philadelphia Chamber of Commerce, as having been in business continuously for over 100 years. It was founded in 1812 by James Smith, whose name has been a part of the style of the company ever since that time.

The United States Tariff Commission has just issued, under the title "Handbook of Commercial Treaties," an exceedingly useful contribution to the study of commercial treaties and tariff agreements, which presents a comprehensive analysis of the stipulations contained in the commercial treaties of all nations. The work is prepared in such a manner that it presents the contents of any particular treaty in the most effective manner, and its arrangement and completeness eliminates the necessity for a preliminary search to determine what commercial conventions exist between the countries in question, but also it presents a carefully prepared, classified summary of what these treaties contains. Full particulars are given so that definite reference is supplied in the case of each subject to volume, page, and article of the treaty concerned, so that the authentic text of the stipulation in question may be found at a moment's notice. Besides the digests of treaties, the volume contains chapters setting out the established principles of international law regarding negotiation and operation of treaties, and comprehensive chronological lists of treaties in force between all nations. An appendix brings the work down to March, 1922, and lists separately the treaties containing conventional tariffs, etc. In a word, this book represents a new departure in the literature of international treaties, and should be especially valuable in that no previous analysis of commercial or other treaties has been before published, and because of the fact that the unsettled state of international relations and the readjustments now in process all over the world should make this book as timely as it is original and useful for the manufacturer interested in the subject. Copies may be procured from the Supt. of Documents, Government Printing Office, Washington, D. C., at 75 cents a copy.

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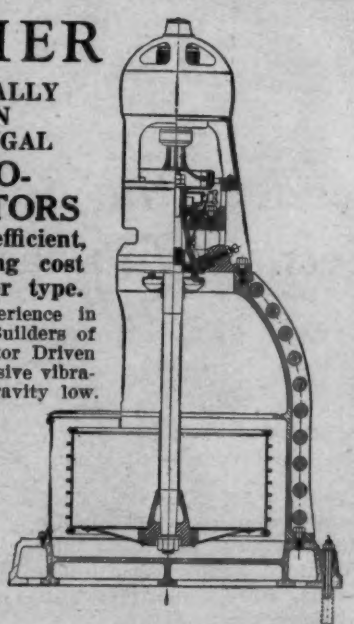

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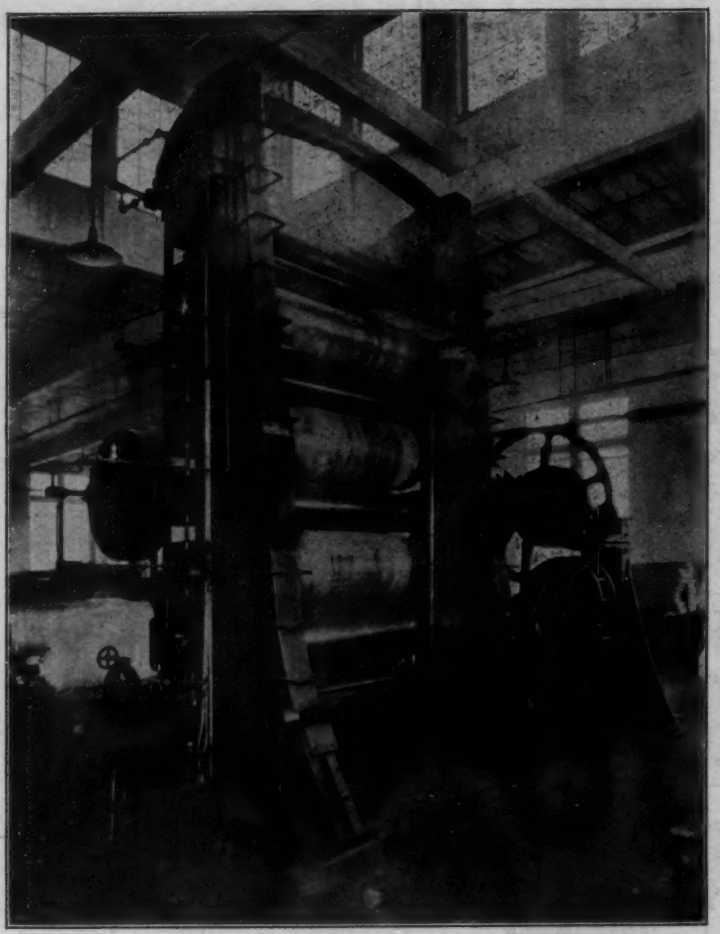


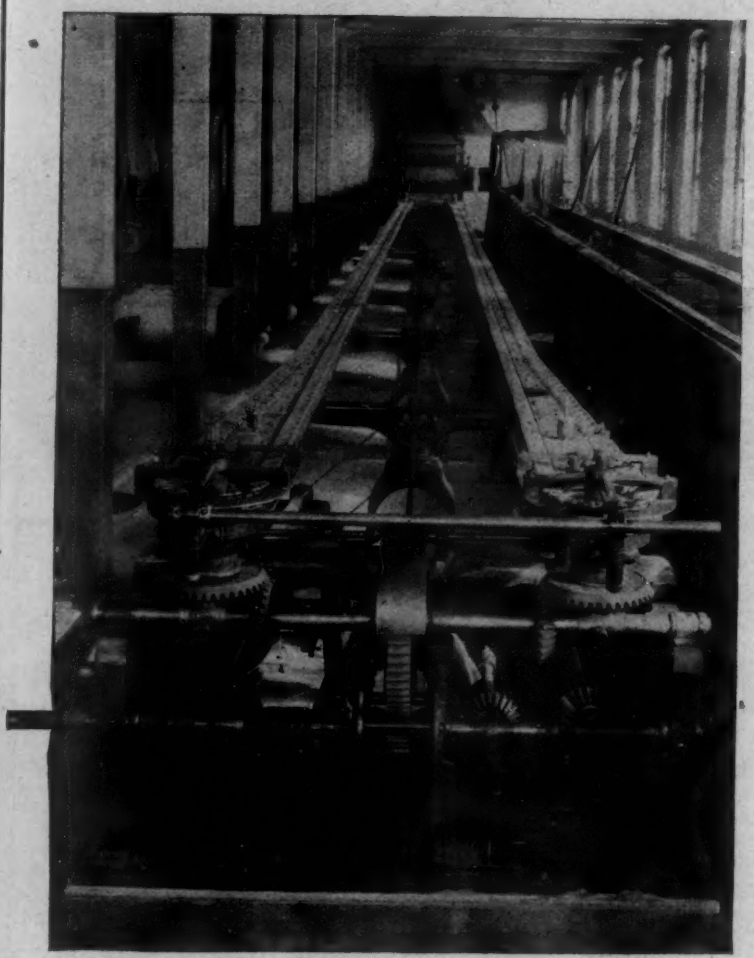
"What we need in the South is more finished fabrics ready for trade"

This is part of an address made by Mr. L. D. Tyson, president of the American Cotton Manufacturers Association when he opened the sessions of that body recently in Washington, D. C.

Mr. Tyson, who is president of several companies making cotton goods, said also that the South needed more bleacheries, more dyeing establishments, more converters, and more printing and mercerizing plants.

BUTTERWORTH

To those who may have been set thinking by Mr. Tyson's remarks, we offer the services of the Butterworth Organization



The name Butterworth stands for more than just finishing machinery. Behind it are 102 years of experience in designing, constructing and developing finishing machinery.

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A softer, whiter, more lustrous bleach is the result of substituting sulphurous acid for sulphuric Acid. As an anti-chlor sulphurous acid is unsurpassed.

The MACOMB Sulphurous Acid Generator manufactures sulphurous acid right in your own bleachery, in quantities only as your immediate demands require—and at a greater saving than it can be obtained elsewhere.

It can be installed to deliver direct to scouring machines or storage tank. Constructed entirely of lead, it is indestructible from chemical reaction, and is guaranteed gas-tight.

Occupies 36 sq. ft. floor space and requires only 2 H.P. to operate.

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Write us for more detailed information.

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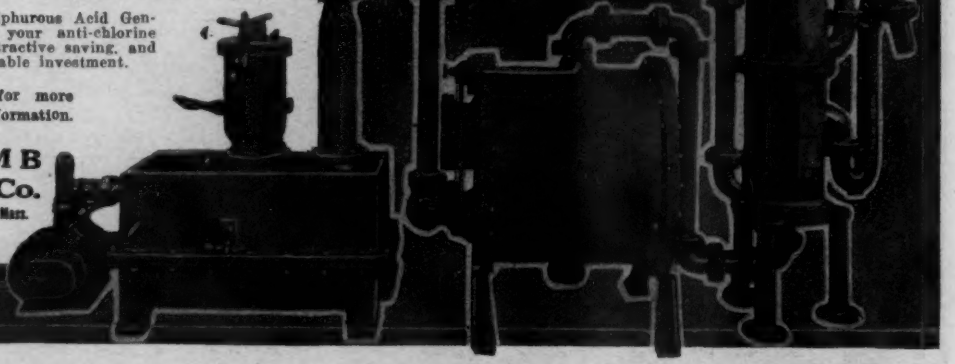

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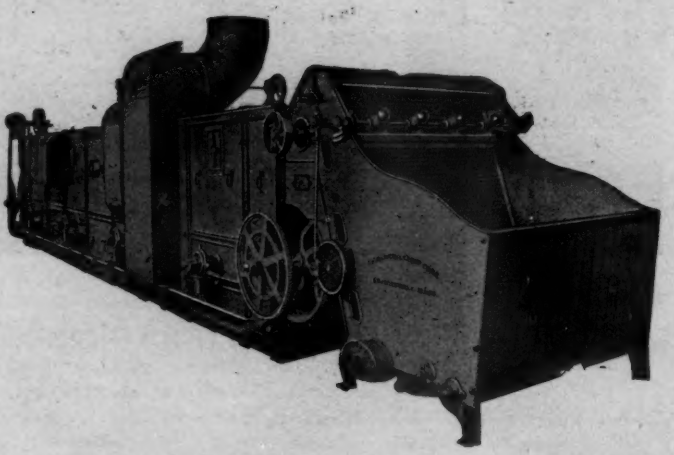
Made in models for drying cotton, linters, wool, hair, flax and any raw materials.



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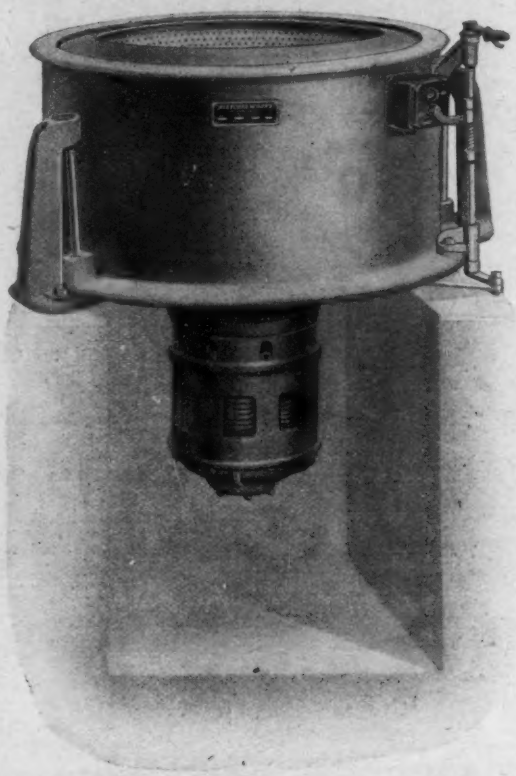

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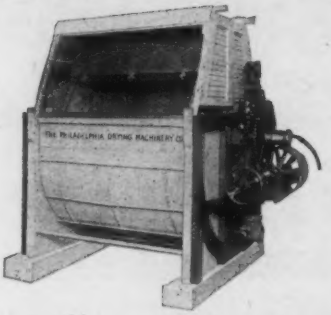

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If you dye or bleach hosiery it will pay you to investigate the many advantages of our latest type machine.

It is suitable for dyeing or bleaching cotton, mercerized, silk and artificial silk hosiery.

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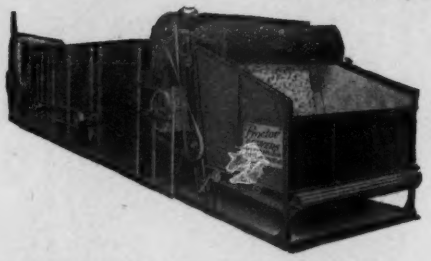

The "Proctor" Automatic Raw Stock Dryer—incomparable for drying dyed and bleached Cotton, Linters, Wool, or any other fibrous or loose material. Send for a catalogue.

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Especially designed to meet all requirements of Textile Mills.

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SIX TO TWELVE loads per hour are being secured by manufacturers everywhere using these rugged dependable machines.

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We know and can provide the proper type of starch.

400 MILL
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BLEACHING and FINISHING PLANTS have learned that "any old" STARCH or DEXTRINE will not do the work. To secure the proper "feel," the desired weight, the attractive finish, careful discrimination must be exercised in selecting.

STARCHES and DEXTRINES

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Many customers' letters prove the point.

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Profit by the experience of others. Test Amalol and Gluantine. 90% of our customers were satisfied with old methods until they tried our products.

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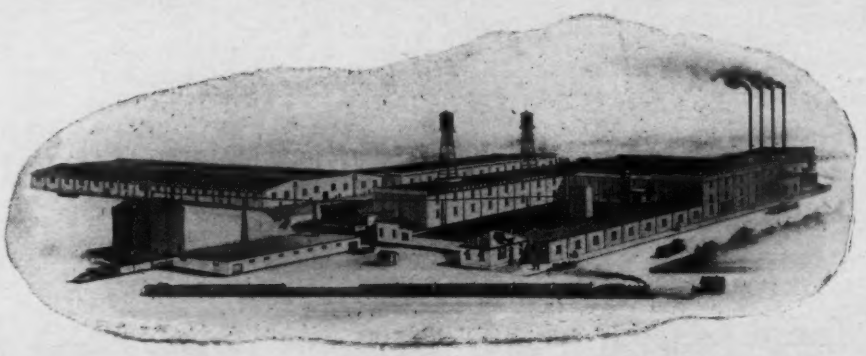

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It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

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The saving in Beaming and Dyehouse Labor costs alone are sufficient to pay off the cost of the Plant in the first year's working.

Exclusive Patent Rights have already been granted in many States and Territories in the United States, and the Plants now at work are capable of bleaching and dyeing over one million pounds weekly. Colored Manufacturers desirous of acquiring the "Rights" for their own State or territory should apply to:

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DYEING continuously up to 2,000 pounds per hour in one Apparatus, VAT, SULPHUR AND DIRECT COLORS.

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Colored Spinning production equal to Grey Spinning.

Colors are brighter and more lustrous than when dyed by any other method. *Dyeing perfectly fast and even,* and at *less cost* in *dyestuffs.*

No *whizzing* or *hydro-extracting.* *Labor costs of Dyeing and Drying need not exceed ten cents* per 100 pounds of Raw stock *dyed and dried.*

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Exclusive Patent Rights are now being granted to Colored Goods manufacturers for their own State or Territory.

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Leaves No Argument as to When

"BLACK IS BLACK"

WHY BE SATISFIED

with a RUSTY BLACK when you can have a RICH LUSTROUS BLACK by finishing your Hosiery with the latest, most efficient and satisfying patented preparation

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Send us a pair of unfinished stockings, skein of yarn or a piece of fabric—cotton, silk, artificial silk, wool or mixes—which has been dyed black, washed, but not finished. We will finish it with "DEVELOPENE" and return to you.

There will be such an improvement that you will immediately want "DEVELOPENE" for finishing your goods.

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For stripping and discharge printing

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For boiling out or stripping artificial silk the use of

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And what is more, this Wyandotte Textile Soda run leaves the silk in prime condition for either bleaching or dyeing, insuring as it does uniformly clean conditions.

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WYANDOTTE, MICH.

ATTENTION COTTON BLEACHERS

If you are located in New England, New Jersey or Eastern Pennsylvania, it will be worth your while to communicate with us and arrange for a personally conducted Test Boil-Out of

SOL-ESCO

A soluble, all-mineral, boiling out salt that completely extracts impurities but preserves the life and strength of the fibre. We now have a practical mill man conducting tests in Eastern Bleacheries and the improvement in feel, extraction, dyeing, evenness, and saving in time is striking.

Full Particulars on Inquiry.

The Electric Smelting & Aluminum Co.
Lockport, N. Y. Detergent Specialists.

Why Do Cotton Mills All Over the South Use

OUR

Roller, Clearer and Slasher Cloths

Why use inferior roller, clearer and slasher cloths, while mills all over the South are deriving such excellent results from the use of our products?

Our years of experience in the manufacture of high-grade roller cloths of just the right cushion and uniformity of surface to produce perfect results enable us to meet your requirements to your entire satisfaction.

Our clearer cloth is of the best material with thick strong nap that does not pull out and its uniform length is such that the rolls are cleared entirely of short fibre.

We can supply you with quality slasher cloth, having sufficient cushion and porous to thoroughly force the sizing into the yarn.

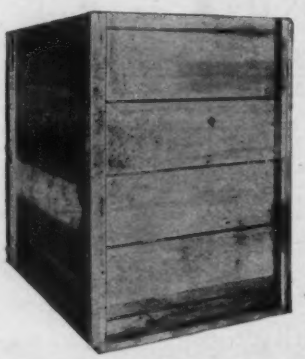
Why not benefit by our years of satisfactory service and the quality of our goods as do the many other mills of the South?

Send us a trial order or write us for prices.

PHILADELPHIA FELT COMPANY

FRANKFORD, PHILADELPHIA, PA.

Southern Sales Agent: M. C. Sanders, Greenville, S. C.



Cypress Tanks
Wooden Packing Cases
ALL STYLES

Manufactured from

GEORGIA PINE POPLAR CYPRESS

WHITE PINE and GUM

Your Inquiry Solicited

Hightower Box & Tank Co.

Corner Humphreys and Glenn Streets

BOX 1025 ATLANTA, GA.

"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

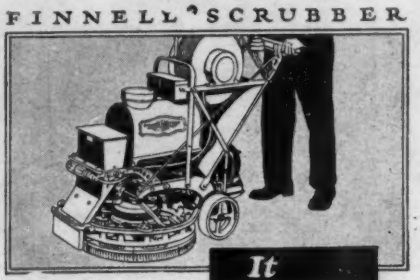
The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable binding. You can secure them in conjunction with a subscription to COTTON.

Write for circulars and full information.

Save Money IN YOUR MILL!

FINNELL SCRUBBER



It SCRUBS *Electrically!*

Use the

FINNELL SYSTEM

of Power Scrubbing

and show a profit in your Mill on what is now non-productive labor. Over 300 other mills are showing a profit by using this System. It can save money and make money for **you.** You can have cleaner floors at one-half the cost.

It gets the dirt out of the mill and keeps it out. It gets the oil out of the boards and keeps it out. It maintains the natural white color of the boards continuously.

Do you want CLEAN FLOORS at less cost?

WRITE US NOW.

AMERICAN SCRUBBING EQUIPMENT CO.

General Offices and Factories:
1229 N. Collier St., Hannibal, Mo.

DISTRICT OFFICES

ATLANTA	CLEVELAND	MINNEAPOLIS	PHILADELPHIA
BALTIMORE	DENVER	NEWARK	PITTSBURGH
BOSTON	DETROIT	NEW ORLEANS	ST. LOUIS
CHICAGO	LOS ANGELES	NEW YORK	SAN FRANCISCO

"Clean Floors Reflect Clean Business"

Are your floors CLEAN?

THE AMERICAN MILL VILLAGE LAUNDRY

The ironing room of one of the better known, successful textile mills, equipped by The American Laundry Machinery Company.

Shifting, transient labor means lower production and added expense. Steady, satisfied workers mean lessened labor turnover, and added profits. An American Mill Village Laundry will secure you these benefits, and pay you a profit while doing it.

The American Laundry Machinery Company

Specialty Dept. C.
Cincinnati, O.

Canadian Office
The Canadian Laundry Machinery Co., Ltd.,
47-79 Sterling Road, Toronto, Ontario, Can.

Representatives in Great Britain
American Laundry Machinery Co., Ltd.
36-38 Victoria St., London, S. W.-1, England

The American Laundry Machinery Company,
Specialty Department C,
Cincinnati, Ohio.

Gentlemen: Send me the complete details about American Mill Village Laundries for Textile Mills. It is understood this involves no obligation to myself.

Name .....

Firm ..... State.....

City .....

Send the Coupon for full information

Your Roving Spindles

All Textile Mills have ROVING SPINDLES that are worn at the top, where the Flyers Fit, or they may be broken off. In either case they need REPAIRING or REVERSING.

Our method of Welding Tops by Electricity, then forge down on a heavy forging machine, to a rough size, makes the *part Repaired Tough and of the Best Wearing Quality.* They are then ground to a uniform size, which makes the SPINDLES as GOOD as NEW.

If the bolster bearing has worn to a smaller diameter, or worn flat, we weld the SPINDLES by taking off the whole worn part and replacing it with a new part. This makes the SPINDLE Full Size With All Bearings.

All Our Work Is GUARANTEED
NOT TO BREAK AT WELD.

We Are Equipped to Duplicate Any Style Flyer Presser — Catalog on request.

Southern Spindle & Flyer Company
Charlotte, N. C.

Manufacturers, Overhaulers and Repairers of Cotton Mill Machinery.

W. H. MONTY, Pres. and Treas. W. H. HUTCHINS, V.-Pres. and Sec.

Obtain Standardized Costs
Set Piece Work Rates

Here's the Watch for Every Textile Time Study Job.

Only six seconds waste on an operation in an eastern factory—but locating it with the watch saved thousands every year. A nationally known Textile concern says: "We eliminated one-fourth the labor, cut costs by 22%." Cheney Bros., Champlain Silk Mills, Unity Spinning Mills and many others are doing the same thing. How? By Time Studies with Silberberg watches. **Whether it's locating wastes, setting piece work rates, establishing bonus systems** or many other uses—there's a Silberberg instrument specially made for the job.

The Decimal Duration Watch—Gives production figures up to three minute jobs with special arrangements for timing jobs up to 30 minutes. It also has the decimal dial and "take out time" feature.

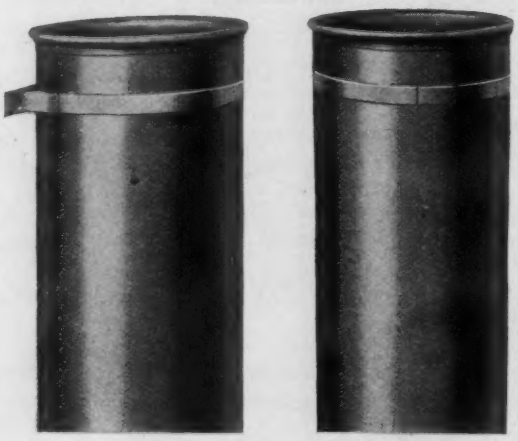
With each purchase of any type of our watches we will include at **no additional charge** one set consisting of our 3 Text Lesson Course on "TIME AND MOTION STUDY" including how to set **Piece Work Rates** and how to obtain accurate **Labor Costs.** All data contained therein broadens the scope and use of Time Study Watches in the Industries.

This course regularly sells for $10.00. **Absolutely FREE with each Watch.** Send for illustrated pamphlets and catalogues. **Any of our instruments on approval to responsible concerns.**

MORTIMER J. SILBERBERG CO.
Peoples Gas Bldg.
CHICAGO
Pioneers in the Manufacture and Sale of Time Study Watches.

The watch illustrated at the top with the decimal dial and "take out time" features gives direct readings in production per hour up to one minute jobs.

The Master Chronograph



SAFETY FIRST

O-C Patented Roving Can Indicators provide the best, simplest and most efficient method of avoiding mixed work in the Carding Department. By eliminating painting and the tying of strings, they remove the unsightly conditions which generally result when trying to avoid mixed work. They eliminate the need for an extra supply of cans, thereby allowing all cans to be in use at the same time, avoiding delay.

A trial order will convince you. Sample sent and prices quoted on application.

O'MALLEY & CARROLL
Manufacturers of
Roving Can Indicators
UTICA NEW YORK

The VERTICO-SLANT
DRINKING FOUNTAIN

is the practical solution of the drinking fountain problem. One of the most important features of the "VERTICO-SLANT" Stream Drinking Fountain is the scientific construction of its nozzle. Raised slightly above the sloping base of recess it is in such a position that the lips of the drinker cannot touch it. The mouth of the drinker comes in contact with the stream, at a point where it loses its momentum thus preventing contamination.

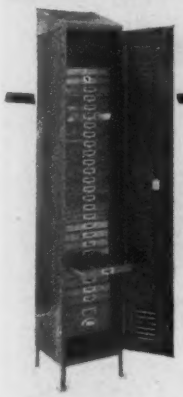
This is a very important item in the consideration of a perfect fountain, and the health of your employees.

Glass or cup can be filled easily from this stream.

The ideal fountain for hospitals, offices, factories, schools, recreation halls, picnic grounds, etc.

Write us today for particulars.

RUNDLE-SPENCE MFG. CO.
MILWAUKEE, WIS.



For sewing machine, knitting machine and other small parts. Drawers divided and subdivided into small compartments, each bearing a label so that any part may be instantly located. Cabinet fitted with lock.

LYON STEEL PRODUCTS

Made entirely of steel, these tables are subjected to the most rigid inspection. No rough edges project to catch threads. Splinters are entirely eliminated. Easily kept clean, fireproof and exceptionally durable. The ideal fixture for hand-inspecting folders, etc. Price an economy, too.

These Lyon Products Were Especially Designed For You

Steel equipment is an economy. Long life, in the face of most severe and constant service, explains it all.

A check on the repairs and replacements always needed when less enduring equipment is in use, will soon show the justification for these Lyon Products, made of steel.

Experienced textile men directed their design. Our organization selected the materials and planned the details of construction. That is why we say these Lyon Steel Products were designed especially for you.

And one of the features of Lyon Steel Equipment is the simplicity of installation. Be it shelving, benches, boxes, cabinets or lockers, it is unnecessary to completely equip your mill at the start. Rather, *with* Lyon Products, you can install a small single unit *now*, making additions as needed.

And making that small initial installation is the one sure way of *proving* its economy.

Any Lyon representative is capable of planning an installation to meet your individual rerequirements—without incurring obligation to you.

Lyon Metallic Manufacturing Co.

Aurora, Illinois

New York Chicago Boston
Philadelphia Cleveland Pittsburgh
Rochester Detroit Los Angeles

Carding room supply cabinet for draft gears, spinning rolls, saddles, stirrups, etc. Creates order and cleanliness.

Spool, roving and bobbin truck. Like all all other Lyon Products, this truck has proved its long life and absolute satisfaction.

L-V-B SPOOLER TENSION

L-V-B Tension Device.

Here's What One Mill Saves

In a mill that changed from warp to filling wind on 20,000 lbs. production, the following result was obtained:

Warp Wind	Filling Wind
Stick Waste 80%	Stick Waste 60%
Spooler Waste 200 lbs.	Spooler Waste 50 lbs.
1050 doffs.	650 doffs.

Increased production 5% due to less doffing and less breakage.

Changed warp bobbins 7⅛ to filling bobbins 8¾".

Increased speed of spooler from 800 R.P.M. to 1200 R.P.M.

Eliminated ⅓ of spoolers; also improvement on slashing, warping and weaving.

Change from Warp to Filling Wind. Try it out at our expense.

Send 2 filled bobbins and we will forward sample tension on approval.

The L-V-B Spooler Tension means greater production, better spinning and 50% Saving in Waste. Ask for a list of mills that are using L-V-B Tensions.

ADDRESS

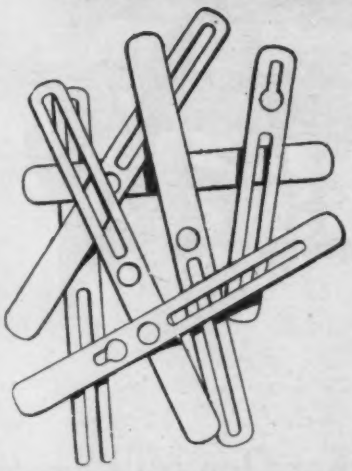
Textile Specialty Company

P. O. Box 531, New Bedford, Mass.

A. B. Carter, Southern Agent,

L-V-B Tension Co., 210 Realty Bldg., Gastonia, N. C.

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

Uniformly made—free from burrs
a reliable source of supply.

The Greist Manufacturing Company,

Dept. "C,"

New Haven, Conn.

A MASTERPIECE

IN
STEEL, WOOD, FELT AND SHEEPSKIN
THE
WASHBURN WOOD TOP ROLL

An intermediate top roll for Spinning Frames.

Designed and fabricated by practical mill men.

Experienced Supers and Boss Spinners everywhere are smoothing out their spinning troubles with this simple, inexpensive roll.

Every cotton spinner should familiarize himself with this roll and its possibilities.

Don't hesitate to introduce it in your mill. It will always make good.

The saddles and cap bars of all spinning frames permit the use of Washburn Wood Tops.

Write today. We have an attractive offer for equipping a test frame in your mill.

WASHBURN

NEW BEDFORD, MASSACHUSETTS

Dependable Textile Specialties.

THE
"Southwestern Iron Clad"
Is the IDEAL Cotton Mill Broom

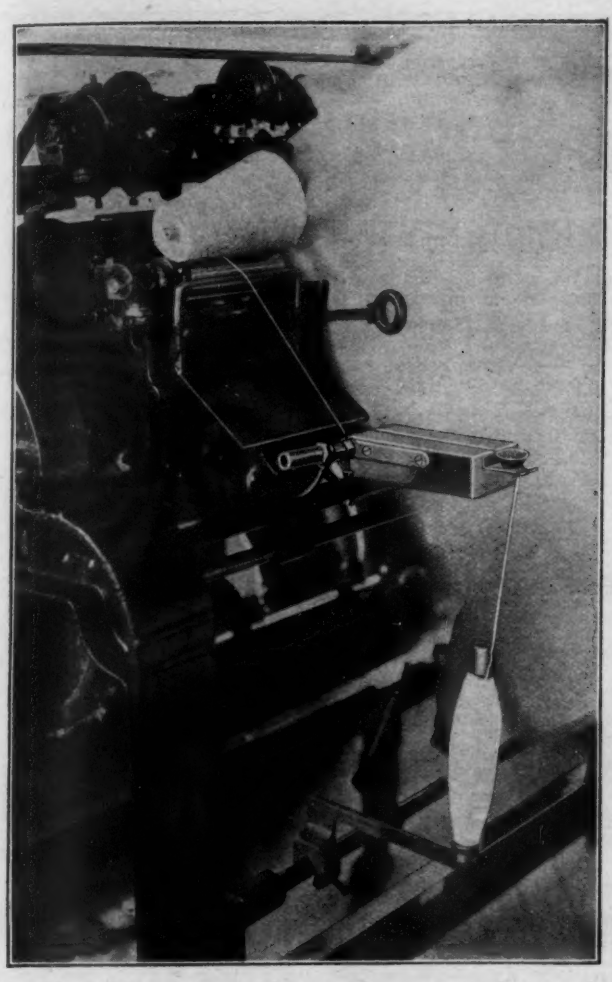
Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT!
PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through
all principal distributors.

The Southwestern Broom Mfg. Co.
Evansville, Indiana



The Eclipse

AUTOMATIC YARN CLEANER

An entirely new principle is involved in that the yarn is cleaned by **flexible** blades which vibrate **constantly.** This device is small and compact and easily attached. The strength and elasticity of the yarn is not affected in the slightest. Adapted to any type of winder or spooler. When writing please mention the type.

ECLIPSE TEXTILE DEVICES, INC.

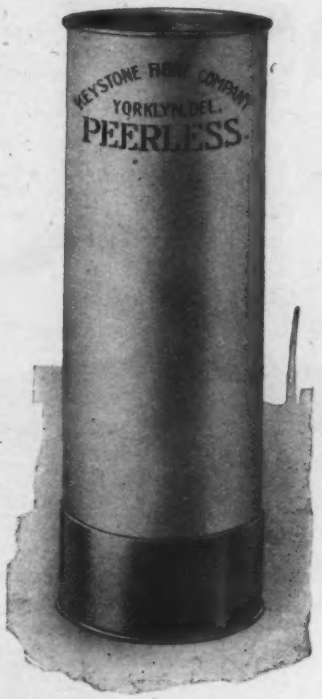
ELMIRA, N. Y.

Makers of
Automatic Yarn Cleaner
Automatic Stop Motion
Yarn Tension Device

KEYSTONE

"Peerless" Seamless

ROVING CANS



In competitive tests under the most strenuous practical usage Keystone Peerless Seamless Roving Cans prove to be the most economical because they give longer and better service.

Painstakingly built of flawless Keystone Fibre—weight by weight by far the strongest.

Keystone Holloware for mills always means savings. Write for booklet describing full line.

Orders filled through any responsible mill supply house, or direct.

Keystone Fibre Company
Yorklyn, Delaware
Box 345-B

Southern Representatives: Wilson Company, 408-409 News Bldg., Greenville, S. C.; New York Office: 30 Church St.; Chicago Office; 565 West Washington Blvd., Philadelphia Office: 21 N. Juniper St.; Boston Office: 136 Federal Street.

VERMONT SPOOL & BOBBIN CO.
OF
BURLINGTON, VERMONT.
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.
Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.
Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.
Give us a trial order and you will remain one of our satisfied customers. Write for prices.
"Good Goods at Fair Prices."
VERMONT SPOOL & BOBBIN CO

SPINNING RING SPECIALISTS SINCE 1873
SPINNING RINGS
TWISTER RINGS
SILK RINGS
DIAMOND FINISH
TRAVELLER CLEANERS
TRAVELLER CURBS
GUIDE WIRE SEATS
WHITINSVILLE
SPINNING RING CO.
WHITINSVILLE, MASS.

BRUSH REPAIRING

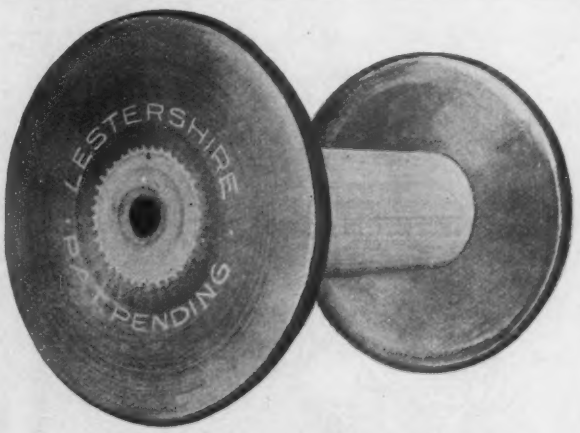
Repairing, renewing, refilling and restoring worn brushes is a service we render textile mills that reflects the excellence of our manufacturing product.

The facilities for repairing are just exactly as good and efficient as the manufacturing, and when card cylinders need refilling, or other brushes need restoring, you can send them to us with the certainty of getting the best repair work possible.

ATLANTA BRUSH COMPANY

Atlanta, Ga.

What Part of the Spool is First to Wear Out?



Your superintendent will confirm our statement that 99% of all Warper, Twister or Spooler Spools become useless on account of the heads breaking, wearing rough or loosening. This is true of all types of Spools heretofore on the market.

With the Lestershire Type Vulcanized Fibre Head Spools just the opposite is true. The Heads will outwear the barrels because Hard Vulcanized Fibre (the same material from which end thrust bearings and automobile gears are made) will never break, wear rough nor splinter.

Of course the first cost is higher but, figuring your charges per thousand spools per year, they are by far the most economical spools on the market today.

In addition Lestershire Fibre Head Spools will in the ordinary mill give you an increased unloading production of nearly 50%. Put a row on your creel and compare the time necessary to unload with any other type Spool.

On the smooth Rock Maple barrel, cleanly jointed to the Fibre Heads which cannot get rough and cannot be dented, there is no place for the yarn to catch.

Spindle wear is also eliminated by bushings of hard well seasoned Dogwood.

Increased traverse can be had which will give you greater yardage on your spools. This means a saving of many dollars in the course of a year, not only direct but in labor required to change the spools.

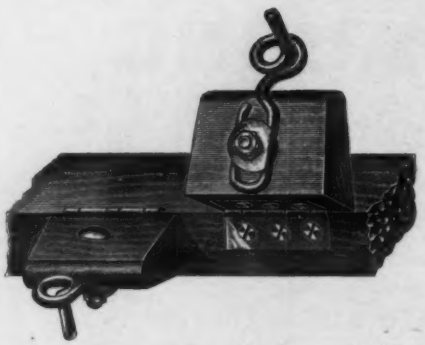
At your request we will gladly send samples for purposes of test and comparison.

LESTERSHIRE SPOOL & MFG. CO.

Manufacturers Mill Spools, and Bobbins, of Description

JOHNSON CITY, N. Y.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

BREATHE LAUNDERED AIR

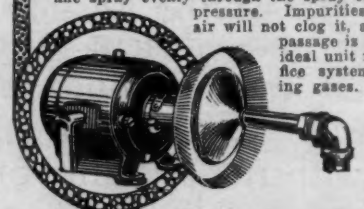
Clean, wholesome air, containing the proper proportion of humidity, conditioned to a comfortable temperature is absolutely essential in industrial, office, public and school buildings.

The Bayley Turbo Air Washer

Supplies pure air by passing atmospheric air through a dense water spray to eliminate impurities, and through a conditioning chamber to regulate temperature and humidity. Uninterrupted service is assured by an atomizer that

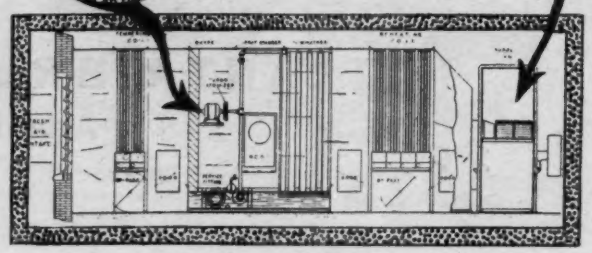
Will Not Clog

The Turbo-Atomizer (shown in the circle) distributes a fine spray evenly through the spray chamber at low water pressure. Impurities washed out of the air will not clog it, as the smallest water passage is 5/8" in diameter. An ideal unit for replacing fine orifice systems. Also for washing gases.



Send for free bulletins today.

BAYLEY MFG. CO.
Dept. I,
MILWAUKEE, WIS.



SAVOGRAN

Cleans Floors Thoroughly and Economically

Sent on Trial

INDIA ALKALI WORKS

BOSTON, MASS.

AMERICAN SUPPLY COMPANY

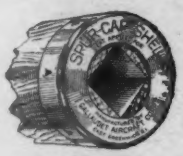
PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping,
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.



Pat. Applied for

SPUR-CAP SHELLS

Made to Stand the Hard Knocks

MANUFACTURED BY

GALLAUDET AIRCRAFT CORP'N.,

EAST GREENWICH, R. I.

FEATHERBOARD

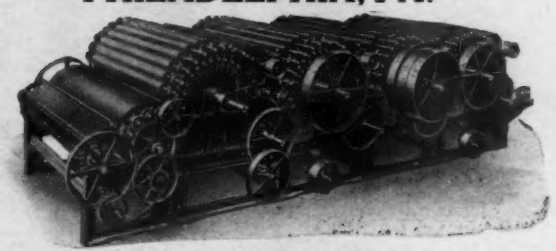
The Master Cloth Reel

LIGHT AND STRONG. IMPROVES YOUR PUT UP.

SMITH & FURBUSH MACHINE CO.

PHILADELPHIA, PA.

A Garnett Machine of this size will reduce to fibre hard twisted thread waste without materially shortening the staple. We also build smaller machines for working soft washes.



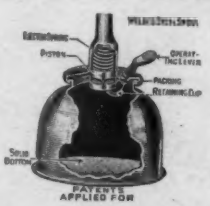
4 Cylinder 30-inch Garnett Machine.

This Garnett is built on our own sectional unit frame construction and contains many improvements which we will be glad to explain.

Ask for Circular S-182.

DROPS OF OIL

LIDSEEN says, "place oil in the bearings. Not in quantities, but by the drop. Know that it is forced in."



Interior view showing simplicity in construction.

Showing wide opening for filling, also curved flanges and locking members which make it leak and wear proof at this connection.

The results from using a *Lidseen Textile Hand Oil* can are wonderful.

In mills where they are used, their troubles are over.

Sturdy construction
Welded spouts
Simple construction

This is truly the last word in an oiler to prevent spoilage of goods.

Ask your jobber or me.

LIDSEEN

832-840 S. Central Ave., Chicago

Perfect Oil Filtration

50% to 90% Saving

The cost of high-grade oil is entirely too high to throw it away after it has been used.

The Burt Oil Filter has been known to save 90% on oil bills, and we make the positive assertion that it will save you at least 50% on your total oil bill.

BURT

Oil Filters

can make an attractive saving in your mill. Its perfect filtering medium assures you of a clean oil ready for use, entirely free of grit, dirt or other foreign matter.

Let us consult with you on your oil filtering problems. We will send you a Burt Oil Filter for 30 days subject to your approval—no obligation. Also ask us for the Burt book.

Write for free booklet.

The Burt Manufacturing Co.

244 High St., Akron, Ohio, U. S. A.

Manufacturers of the famous Burt Ventilator and Exhaust Head.

A Variety of Work
on the same machine

In addition to business correspondence the modern office has a large variety of work for the typewriter.

Tabulating, billing (simple and condensed), stencil cutting, including Elliott and Belknap stencils, writing on ruled lines and many other kinds of office work can be done on the L. C. Smith & Bros. Typewriter.

The decimal tabulator and the variable line spacer are part of the inbuilt service of every L. C. Smith & Bros. Typewriter.

Send for free Catalog.

L. C. Smith & Bros. Typewriter Co.
Home Office and Factory : SYRACUSE, N. Y.
Branches in all Principal Cities.

Kleradesk—your present system—plus

The Kleradesk adapts itself to your peculiar requirements—combining both horizontal and vertical handling of desk papers.

Sorts and routes departmental mail; holds reference papers out of way but immediately at hand when needed. Saves time. Efficient. Convenient.

A Steel Sectional Device

Add compartments as required. Vertical sections $1.20 each. Four-compartment combination illustrated below $6.65. Indexed front and back. Write for free, instructive, illustrated folder, "How to Get Greater Desk Efficiency."

Ross-Gould Co., 318 N. 10th—St. Louis (7)
New York, Chicago, Cleveland, Philadelphia

PRINTING

WE do it for some of the largest mills in the South—*Why not for yours?*

If our prices and service were not right, we could not do it.

THE A. J. SHOWALTER COMPANY
Dalton, Georgia.

ESTABLISHED 1887

BYRD PRINTING CO.

46-48-50 W. Alabama St. Byrd Building
Atlanta, Ga.

Offers experience, equipment and service to its patrons which are unexcelled by any printing plant in the country. Special forms for factories and mills solicited. Prompt deliveries, splendid service and perfect satisfaction in every detail guaranteed. A trial order will make you a regular customer.

Try Us Once!

The Box Truck
that exactly fits textile mill uses

All direct and indirect handling economies are enjoyed by the many leading mills that use Lewis Box Trucks, Transfer Trucks and Baskets.

Built to last ten years and longer—light in weight—pilfer proof — supplied with detachable and washable canvas liners—fitted with thread guard casters—shipped KD—manufactured in large quantities and priced accordingly.

We have never failed to save the mill money when a textile handling problem was put to us. Lay your problem before us and we will gladly offer suggestions. Write today for the Lewis "Bulletin on Trucking in Textile Mills."

LEWIS
Box Trucks

G. B. LEWIS CO., Box Truck Div. C.14 WATERTOWN, WIS.

John Cronin, 13 Hamilton St., Boston, Mass.; Mill Specialties Co., 439 Arch St., Philadelphia, Pa.; W. Gracey Co., 230 Broad St., Spring City, Pa.; E. C. Buehrer Co., 18 Front St., San Francisco, Cal.; J. D. Collins Sales & Engineering Co. 55½ Luckie St., Atlanta, Ga.; R. E. Stanton Equipment Co., 615 Ryan Annex, St. Paul, Minn.; R. R. Street & Co., 28 N. Clinton St., Chicago, Ill.; Edw. L. Koehnig Co., 23 W. Kinzie St., Chicago, Ill.—Detroit address—Ryerson Bldg.—Milwaukee address—114 Grand Ave.—Alvin Lovingood Co., 14 Walker St., Atlanta, Ga.

MEECO
Metal Equipment For Shop And Factory

DRINKING FOUNDATIONS

The Standard for 15 Years

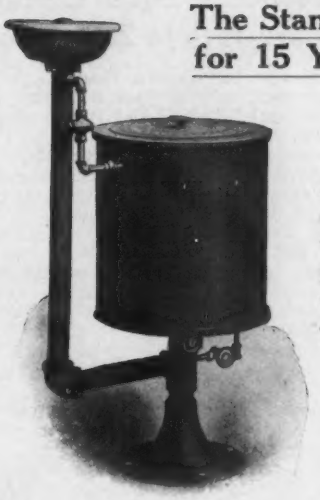


Fig. 604 ICE-COOLED

Eleven Other Types From Which To choose

SANITARY—DURABLE—EFFICIENT—LOW IN COST
Write for catalog and new price list.

MFG. EQUIPMENT & ENG. CO.
FRAMINGHAM, MASS.

"Royal-Chicago" PRODUCTS

HOSIERY MILLS!

We have designed some types of chairs that are specially adapted for

LOOPERS
FOLDERS
TOPPERS
SEAMERS
MENDERS

No. FS-22 Patented Adjustable legs and back-rest.

These chairs are an important development and merit your investigation—even if you do not require a single chair.

Several of the larger mills are actually enthusiastic over them.

Royal Metal Mfg. Co.
Builders of Correct Industrial Seating
2321-2325 S. Western Ave.
Chicago Illinois

Puritan CANTONMENT DRINKING FOUNTAINS

Sanitary and Practical

Practical drinking mound is formed by mechanical means. Interference is set up in stream which retards water at the apex of arc. This stream makes it impractical to drink from any other point, thus insuring perfect sanitation.

Approved by the U. S. Government. Now recognized by largest interests and schools in the country.

Puritan "Cantonment" Coolers are designed to connect with pressure lines and are so constructed that the drinking water does not come in direct contact with either the ice or ice water, but is circulated through brass coil which is tinned both inside and outside.

Write today for illustrated literature.

Halsey W. Taylor Company
Warren, :: :: :: Ohio

FIFTH SOUTHERN TEXTILE EXPOSITION TEXTILE HALL

Greenville, South Carolina
October 19th to 25th Inclusive

Will open at ten o'clock Thursday morning, October 19th, will be closed Sunday, and reopen Monday. It will end Wednesday night, the 25th.

This exposition is one of the most important events of its kind in the world. The South spins and weaves a large portion of the earth's production of cotton.

Here will be seen textile machinery, devices, appliances and supplies. No manufacturer can afford not to be informed of the latest inventions, improvements and equipment. The superintendent, overseer or secondhand who misses this show will be handicapped in performing his work. Every mill operative, who can possibly do so, should visit it.

Numbers of mills consider payment of expenses of principal employees to and from the show a good investment.

It will require several days to see all the show. One day, however, is better than none.

We invite all who have an interest in the industrial development of the country to attend.

TEXTILE HALL CORPORATION

Zemco-lite

TRADE MARK

"The Cement Paint"
A Mill White That Stays WHITE

Paint the walls and ceilings of your mill with ZEMCO-LITE, the permanent mill white. For years to come they will remain white, because ZEMCO-LITE is not only the whitest white but the best paint for permanent wear, because of its aggregate of high-grade WHITE Portland Cement. It is mixed with water, which effects an attractive saving over the cost of oil paints. ZEMCO-LITE positively sticks and stays. Will not chip, peal, blister or crack, as is the case with many inferior oil paints.

Send for our price list and catalog.

We also have an excellent line of paints in various colors for exterior mill village painting. Submit your requirements to us.

American Cement Paint Co.

Chattanooga, Tennessee

CONCRETE — DIXIE PORTLAND CEMENT CO. ROYAL CHATTANOOGA, TENN. — PERMANENT

MR. TAXPAYER—YOU!

Do you want your country to spend YOUR good money on roads that will wear out before your bonded indebtedness is liquidated?

I SAY YOU DON'T.

What you want is a hard-surfaced road, with little cost for maintenance—a road that can be traveled in rain or snow, summer and winter. You want a PERMANENT road—that means CONCRETE!

Write for Literature—It's Free

DIXIE PORTLAND CEMENT CO.

CHATTANOOGA, TENN.

VOGEL

PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

- Enameled Roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

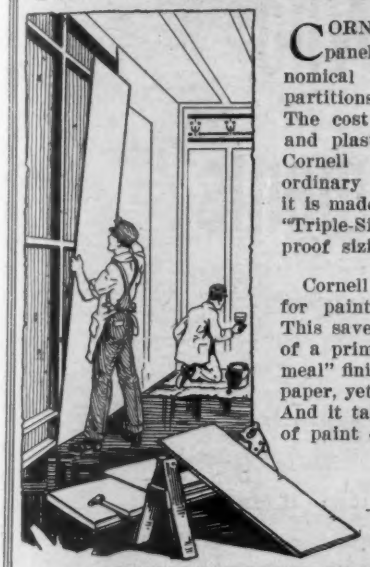
ASK YOUR JOBBER

JOSEPH A. VOGEL CO.

WILMINGTON
DELAWARE

Cornell Wood Board

FOR WALLS, CEILINGS and PARTITIONS



CORNELL-WOOD-BOARD panels make the most economical walls, ceilings and partitions for mill-housing. The cost is lower than lath and plaster or plaster-board. Cornell lasts longer than ordinary wallboard because it is made of pure wood fiber, "Triple-Sized" with moisture-proof sizing.

Cornell comes all primed for painting—"Mill Primed." This saves the labor and cost of a priming coat. Its "Oatmeal" finish rivals costly wallpaper, yet costs nothing extra. And it takes a perfect spread of paint or calcimine.

Send for Sample.

CORNELL WOOD PRODUCTS CO.
GENERAL OFFICES: 190 N. STATE ST., CHICAGO
Water Power, Mills and Timber Lands in Wisconsin

Look Into It!

Perfect lighting of the mill interior is today, more than ever, an economic necessity, and of all lighting, natural daylight is the best and cheapest.

If you are contemplating changes in your mill, new additions or a new mill construction, look into the matter of skylights. This interesting booklet tells how skylight roofs can be made as substantial as any other roofs, how glass breakage has been eliminated and corrosion prevented, how better lighting and more perfect ventilation is assured, illustrating many installations, and containing other data of value to the mill man.

A copy should be in every mill man's file. Write for your free copy today.

THE G. DROUVE CO.
BRIDGEPORT, CONNECTICUT

This Space Reserved for the

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION

Cleveland, Ohio

Are You the Man Who "Never Reads Advertisements?"

Some men, who are neither blind nor illiterate, claim sincerely that they "never read advertisements."

Yet, if you could investigate, in each case you would find that the man who "never reads advertisements" uses an advertised tooth paste or shaving cream or soap. If he owns an automobile it will be an advertised car. If you ask his opinion of any automobile he will reply in words that might have been lifted bodily from an advertisement of that automobile.

Advertising has formed his opinions to a great degree. He may have received his information through others who obtained *their* knowledge from advertising. But it is a fact that no man can escape the effect of advertising even if he does say he "never reads advertisements."

Not one of us ever reasoned out entirely from his own mind that the earth is round. If we had not read it or heard it we would never have known it.

In these days of good, truthful, helpful advertising to say, "I never read advertisements" is merely your way of saying, "I don't read *all* advertisements."

[Published by COTTON in co-operation with The American Association of Advertising Agencies]

Evener Laps—More Production!

Mr. W. C. Cobb, General Superintendent of the Ware Shoals Mfg. Co., said at the Textile Association Convention in June that ball bearings on his aprons and eveners had reduced the number of laps set back to less than one per cent.

He is getting better laps and more of them than ever before. His numbers are running better, and he has less trouble with breaking strength. You can do the same thing that he did. Order some today.

AldricH MachinE

Ball WorkS Bearings

Greenwood, S. C.

Our Reputation

has been built on these two facts:—QUALITY, ECONOMY. Quality assures better lubrication—Economy means lower cost. You are guaranteed both these results when using

D-A Lubricant

DOES NOT HARDEN, GUM, OR LEAVE ANY RESIDUE.

HEAT DOES NOT MELT, THIN OR DESTROY.

LASTS MANY TIMES LONGER THAN ORDINARY OILS.

USE D-A ON:—Cams, gears, chains, ball and roller bearings.

D-A is guaranteed to be as represented or is returnable. Send us your order on this basis. Special gun for applying given with each order.

D-A Lubricant Company, Inc.
Indianapolis, Indiana

Southern Agent, J. K. Gewinner, Atlanta, Ga.
Northern Agent, MacNichol-Crosby Co., Boston, Mass.

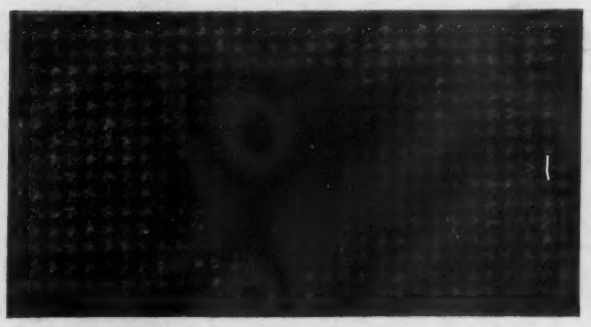
Stained Goods!

Hot Bearings mean short life.

Bearings are expensive.

Oil running out of bearings means dirty floors and machinery. RESULTS! WASTED MATERIAL FROM STAINED GOODS.

STAYSWELL laughs at drips and spatters.



STAINED GOODS ARE EASY TO AVOID BY USING THE SNOW-WHITE STAINLESS GRADES OF STAYSWELL

STAYSWELL "STAYS PUT" on the hottest bearing, eliminating all friction.

Let us quote you on your requirements.

LAMSON OIL CO., Inc.
10 Dorrance St. Wharf
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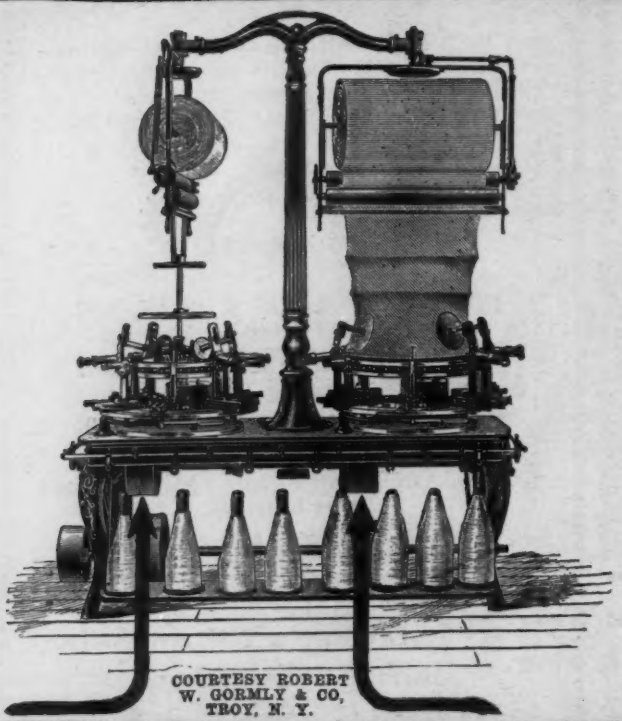
THE JOHNSON FRICTION CLUTCH



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AS USED ON

KNITTING MACHINES

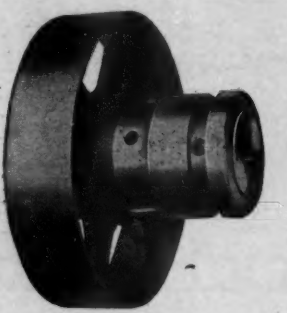
To Replace Tight and Loose Pulleys

Two No. 2 single Johnson Friction Clutches on each machine with a pulley mounted on each clutch hub as shown in small illustration.

No matter what type of machine you are building, there's a Johnson Friction Clutch to meet your needs.

We have a number of special models if a standard clutch will not fill the requirements.

FREE ENGINEERING SERVICE. CONSULT OUR EXPERT ENGINEERS.



SINGLE CLUTCH WITH PULLEY MOUNTED

WRITE FOR STOCK LIST AND "G" CATALOG.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Increased Production Without Increased Power

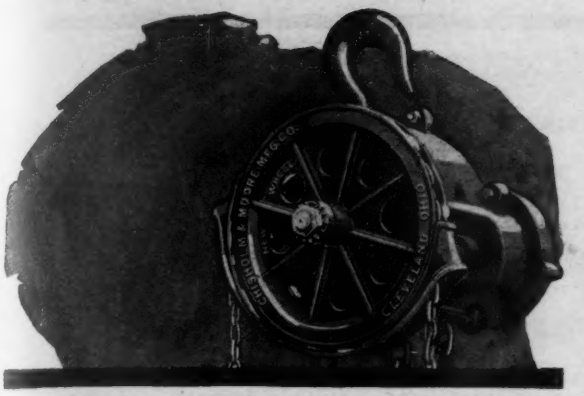
Fabreeka Belting

"FABREEKA" Belting is doing the work and relieving the troubles of many belt users where conditions were considered beyond relief. You can hardly appreciate its value until you have tried it. Less first cost, less stoppage from belt troubles, a saving in power and increased production result from the use of "FABREEKA" Belting.
Runs absolutely smooth, noiseless, and positively true on pulleys.
There are numerous advantages of "FABREEKA" over leather belting.

Submit your belting requirements to us and let us send you full particulars.

Fabreeka Belting Company

30 India Street Boston, Mass.



CYCLONE HOISTS
HIGH SPEED

—lift your production curve!

FASTER, smoother production at less cost *is and always will be* a problem for factory management. A Cyclone Hoist is always one sure means toward that end!

One of the largest factories in the world, famous for the wonderful, efficient production methods developed, has found this repeatedly true. We have just received their order for another lot of more than two hundred Cyclone Hoists. Put a Cyclone on *your* production curve!

Catalog sent on request. We have capable distributors in all localities to aid you in layout of material-handling and hoisting systems and submit estimates. Write.

The Chisholm-Moore Mfg. Co.
Cleveland, O.

Hoists : Cranes : Trolleys

Branches:
NEW YORK : CHICAGO
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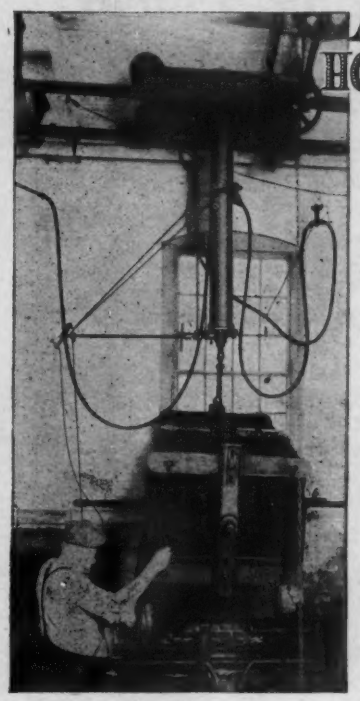
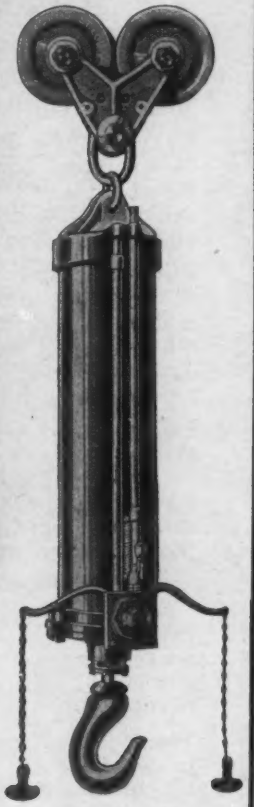
CURTIS
AIR HOISTS





Used in The Textile Industry

"Lift it with air"

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

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Branch Office
532-R Hudson Terminal New York

CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
C.P.M.Co.

Established 1854

Solving the High Cost of Producing Power

POWER users are finding the fuel situation a most trying one. Coal is steadily becoming more expensive, transportation is uncertain —labor trouble at the mines more frequent—and production in general greatly curtailed.

Many are turning to oil engines as the best solution for their difficulties—Primm Heavy Duty Oil Engines are daily proving their superiority over other types of power.

With a Primm installation — fuel shortages are unknown—as they operate on crude, fuel, solar or kerosene oil. This fuel permits the Primm to develop the same power as other types at a much lower cost.

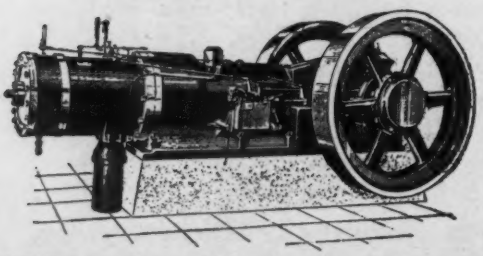
Labor costs are lowered because skilled engineers and firemen are unnecessary. Expensive repairs and breakdowns are almost unknown since the simple, rugged construction, thorough test, and inspection eliminates them.

Made in sizes varying from 20 H. P. to 300 H. P., Primm Oil Engines have proved successful in almost every conceivable power field in the past twenty years.

There is a "Primm" to meet your needs. Write us today for descriptive literature.

The Power Manufacturing Co.

102 Cheney Avenue, Marion, Ohio



PRIMM OIL ENGINES

"SERVICE BUILT IN AT THE FACTORY AND MAINTAINED IN FIELD"

"I am very well pleased with the machine recently purchased; so much so that I have placed an order for a second machine. This new machine will cut up to 4 inches. It is possible that later I will buy another 4-inch and another 6-inch".
A Philadelphia user

OSTER BELT *and* MOTOR

COMBINATION THREADING MACHINES

STRAIGHT PIPE • BENT PIPE • NIPPLES • BOLTS

4 days' work a month for this machine is sufficient to make it show handsome dividends over hand-threading. So simple that a boy can operate it, it takes care of the rush repeat job or the extensive installation in the speediest, easiest way. And in between it reclaims scrap pipe into valuable nipples. Write for *"Pipe-Threading Profits"*, 16 pages of users' testimony.

THE OSTER MFG. CO.

Specialists in Hand and Power Threading Equipment

2061 East 61st Place Cleveland, Ohio

"The 300-A machine which we purchased 12 years ago and which has been in almost continuous operation is still proving very satisfactory and running continually."
A Hamilton, O., user

"We believe your 306-A machine is the best outfit made. Ours has been in use 3 years and we figure it has paid for itself four times over. We'll be glad to demonstrate it."
From Charleston, S. C.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MAHINISTS

PHILADELPHIA, PENNA

Branch Office. 141 Milk St., Boston, Mass.

HENRY FORD SAYS—

"I have striven toward manufacturing with minimum of waste, both of materials and of human effort. Waste is due largely to not understanding what one does, or in being careless in the doing of it."

The Ford plant is run 24 hours a day, and is lighted throughout with Cooper Hewitt Lamps.

Seeing is the same thing, whether cotton or metal is looked at. The waste of human effort and materials by the use of ordinary light in cotton mills is due to the lack of knowledge of the peculiar *quality* of Cooper Hewitt light.

Carelessness accounts for much of this lack of knowledge. The importance of the lighting problem is not fully realized.

Cooper Hewitt Electric Company

Hoboken New Jersey DAYLIGHT

C.H.-128

7½ H.P. 1720 R.P.M. Type "AR" Squirrel Cage Motor

Spinning Frame and Loom Motors

½ H.P. 1720 R.P.M. Loom Motor

Specially Designed Motors having all the requisites for Spinning Frame and Loom Drives. Motors that give uninterrupted service with minimum attention.

Send for Textile Bulletin

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Air Compressors - Air Brakes
Agricultural Machinery
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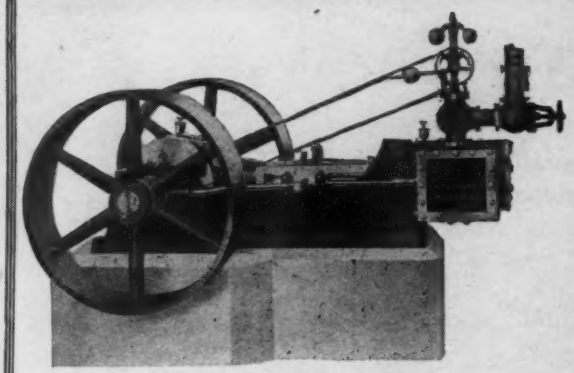

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Macon, Georgia
MANUFACTURERS OF
High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.
Heavy Castings and Wrought Iron Works.

General Electric
Distributing Jobbers

Complete lines of Wire, Switches, Safety Switches, Wiring Devices, Fuses, Edison Mazda Lamps and other electrical materials carried in our Atlanta and Savannah warehouses ready for immediate shipment.

Quick Service

Carter Electric Co.
(WHOLESALE)
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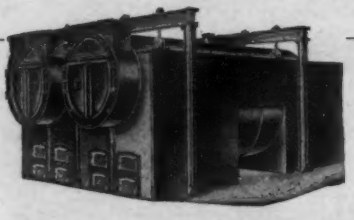

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These years of experience and study together with exhaustive tests and improvements, has enabled us to build modern boilers that are second to none—in design, construction, high efficiency and capacity, economical operation, and low cost for upkeep.

Made in several types. Write us today and let us send you full data and reasons why the W & W BOILER will best meet your requirements.

The Walsh & Weidner Boiler Co.
CHATTANOOGA, TENN.
WALSH & WEIDNER BOILERS
TUBULAR WATER TUBE

WELDING SERVICE
ELECTRIC ARC WELDING MACHINES

When you have a broken machine or a welding job of any kind too large or intricate for your mechanic to handle, remember you can secure the quick service and highest quality of work from Bird-Potts Company.

We use the famous G-E Electric Arc Welding process and latest approved Oxy-Acetylene process thereby using the welding method best adapted for the work at hand, which means the most perfect and permanent weld possible regardless of the size of the job. Our thirteen years of welding experience puts us in a position to serve you with the most efficient and economical welding service possible.

Write us, wire us or phone us—any time. Let us take care of your break-downs, or worn parts.

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Established 1854 *Incorporated 1898*

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Economy is where quality determines the price, not where price controls the quality

GEARS
MACHINE MOULDED
3″ TO 16 FT. DIA.

PLANED BEVEL
UP TO 48″ DIA.

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UP TO 96″ DIA.

SHAFTING (Turned Steel)
PULLEYS
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COUPLINGS,
PULLEYS,
GEARS,
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ETC.

Ball Color Mixer

Nine Sizes—18, 24, 30, 36, 42, 48, 54, 72, 96 inches.

For mixing and secondary grinding of Colors, Chemicals, etc.

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A Recognized Standard

Jenkins Valves occupy an extraordinary position—they are known, not only as good, serviceable valves, but commonly set the standard by which other valves are judged.

Each valve of every type is designed, made, and guaranteed for the maximum service, not merely the average.

At supply houses everywhere. Known by the Jenkins "Diamond" and signature.

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SINCE 1864

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Efficiency and Economy

For highest efficiency in welding and the utmost in economy, STANDARD OXYGEN is unsurpassed.

It is 99.5% pure, the best that money can buy.

There is no need to discard broken machinery or parts when these can be welded and made as good as new, at one-third the cost of replacing with new parts.

Let STANDARD help you keep repair expenses at the minimum.

STANDARD GAS PRODUCTS CO., INC.,
ATLANTA

STANDARD

Welding Apparatus and Supplies

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

The Recognized Standards of Quality

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Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
Arlington Cotton Mills
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Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

30s to 80s Single and Ply Combed Peeler Right Twist. 30's to 50's Single and Ply Double Carded Peeler, Right or Reverse Twist.

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LINEN YARNS

For Weaving, Knitting and all Purposes.

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And Every Description of Linen Thread and Twine

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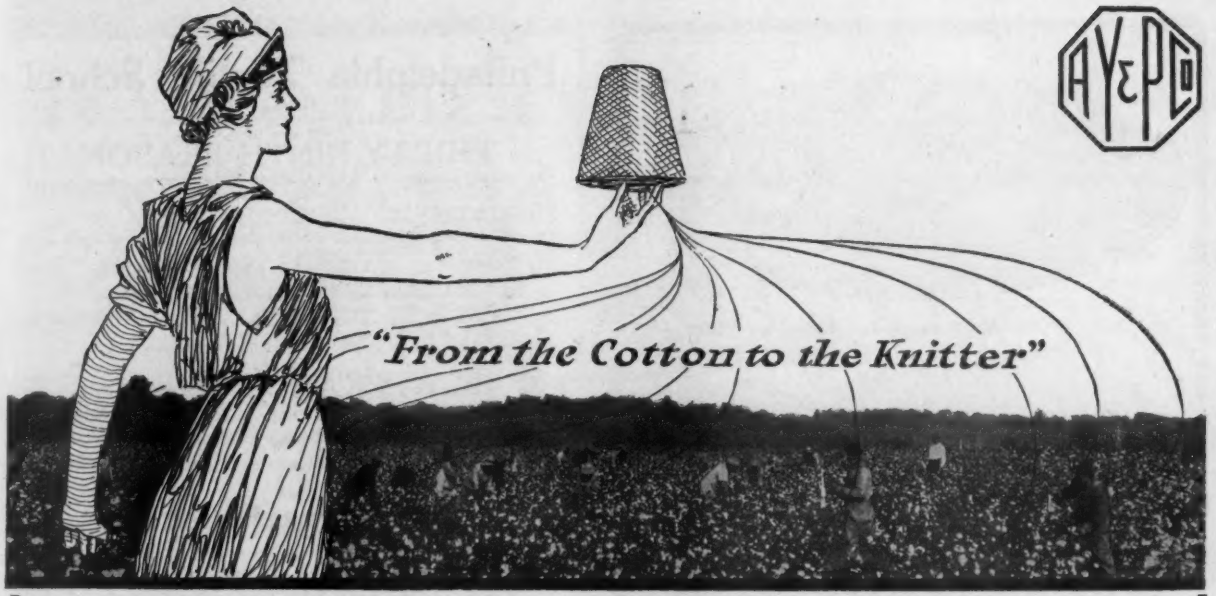

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MOUNT HOLLY, N. C.

SPINNERS AND MERCERIZERS

HIGH GRADE COMBED AND CARDED YARNS—16s to 80s

Our Mercerized Yarns Are the Product of Our Own Mills

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The Home Folks Know

APPROXIMATELY one person out of every nine in the city of Atlanta has an account at the Atlanta National Bank. We don't mean one business man out of every nine, but one out of every nine men, women, children, white and black.

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Active Designated Depositary

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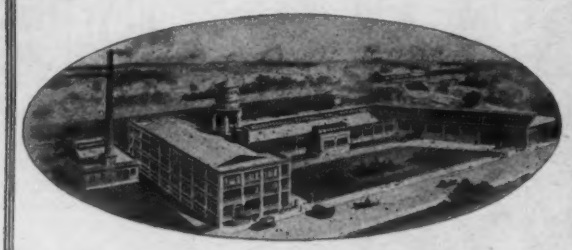

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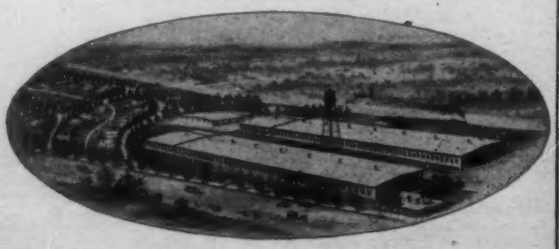

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will open its

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Two Diploma Courses are offered in the Day School.
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—IN—

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For Location of Cotton Mills

The Texas and Pacific Railway serves a number of the most important cotton centers of Texas and Louisiana and traverses the principal cotton producing counties of North Texas and Louisiana.

The State of Texas has only seventeen cotton mills in operation, and is the largest cotton producing State in the Union.

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Delightful and Inexpensive Safe Ocean Bathing Beach

Very cheap summer and week-end excursion fares. Through Pullman Sleeping Cars from Atlanta and Intermediate points to Brunswick, via

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Lineville, Ala	15.00	20.00
Roanoke, Ala.	13.30	17.75
LaGrange, Ga.	12.30	16.35
Atlanta, Ga.	11.90	15.85
Montezuma, Ga.	8.25	11.00
Cordele, Ga.	6.95	8.40
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700 ROOMS 700 BATHS 700 SERVIDORS

MODERATE TARIFFS

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A Matter of Economy

The MARTINIQUE
IS GLAD TO ANNOUNCE REDUCED RATES

SOMEONE must take the initiative in making it possible for people to travel and spend less money—now that there is less money to spend.

So, hand in hand with Hotel McAlpin which recently announced its reductions, the Martinique—just across the street and under the same management—becomes a leader in lowering hotel tariff.

This is setting an advance style, as it were, for there has not been an appreciable reduction in the cost of running a large New York hotel.

If, however, the public esteems the spirit in which it is done, as much as the management of the McAlpin and Martinique appreciates its patronage, then indeed, is it worth doing.

At the Martinique the new prices are: $3.50 up for rooms and bath; $2.50 for room without bath.

The MARTINIQUE
Broadway, at 32nd St., New York
Frank E. Jago, Resident Manager

ATLANTA'S NEW MILLION DOLLAR HOTEL
POPULAR PRICED

HOTEL CECIL
COFFEE SHOP—ROOF GARDEN

312 ROOMS—FIRE PROOF—312 BATHS
RATES PER DAY, EUROPEAN PLAN

	ONE PERSON	TWO PERSONS
22 ROOMS AND BATH	$1.50	
104 ROOMS AND BATH	2.00	$3.00
104 ROOMS AND BATH	2.50	4.00
53 ROOMS AND BATH	3.00	5.00
14 ROOMS AND BATH	4.00	6.00
8 ROOMS AND BATH TWIN BEDS		5.00
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Three Blocks from Union Station
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75 Rooms at $2.50 a day
100 Rooms at $3.00 a day
100 Rooms at $3.50 a day
75 Rooms at $4.00 a day

Excellent Cuisine, Moderate Priced Restaurant, Popular Cafeteria. Write or Wire for Reservations.

R. L. MEYER, *Manager*
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EUROPEAN PLAN
Rooms 600 Baths
Headquarters in Detroit for
OLD COLONY CLUB
DETROIT AUTOMOBILE CLUB

. . DAILY RATES . .

100 at $2.50	Single—	$4.50	Double
150 " $3.00	" —	$5.00	"
100 " $4.00	" —	$6.00	"
50 " $5.00	" —	$7.00	"

50 with Twin Beds, $5.00 to $7.00
100 In Suite, $5.00 to $8.00, Double
Two Floors of Agents' Sample Rooms $5.00 per Day
Table d'Hote Dinner, $1.00-$1.50

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Under New Management
CAFETERIA O. C. FROMAN, Mgr. GRILLE
Business Men's Lunch 50c-75c

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"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

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(When replies are to be received in our care, allow four words for box address.)

FOR SALE

A COMPLETE PLANT OF 24 CROMPTON & KNOWLES 96 inch Jacquard Looms, now running on fine colored mitcheline Bed Spreads, including beaming, winding, sewing and fringing machines. Owner retiring.

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Overseers of Spinning, Spooling, Warping, Winding and Twisting

desires position. Has 15 years' experience on work of this character, last five years as overseer at one mill. Thirty-eight years old, married. Experience has been in the South and can give Southern references as to character, habits and ability. Address Box A, care COTTON, Atlanta, Ga.

WANTED OVERSEER POSITION—American, 35, married. Eighteen years' practical and executive experience in spooling, warping, beaming, slashing, drawing-in and weaving on plain and herring bone weaves. Yarns 8s to 80s, single and ply. At present employed. Best of references. Box 50, care COTTON, Atlanta, Ga.

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Executives, Bookkeepers, Superintendents, Accountants, Stenographers, Overseers, Secretaries, and all other men and women of proven ability to communicate with us. Our services dignified and confidential.

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New and Second Hand

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Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

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WOOD WORKING

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ELEC. MACHINERY

Dynamos and Motors
AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.

Philadelphia, - Pennsylvania

Do You Want to Sell it?

Probably you, like many other mills, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand equipment at a profit? COTTON is read by thousands of Cotton Mills that are hardly touched by Northern journals.

You Can Sell Your Second-Hand Equipment

to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Bldg., Atlanta, Ga.

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for Textile Mills

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Special Bulletins covering various kinds of equipment will be sent on request.

A few of the many offerings:

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8—14-in. Worthington Class B, double suction, 8500 G.P.M. at 152 ft. head, at 1170 R.P.M., direct connected to 300 hp. G.E., 3 phase, 60 cycle, 2200 volt motors.

4—14-in. Allis-Chalmers, Type S, 7500 G.P.M. at 130 ft. heat at 1760 R.P.M., direct connected to 300 h.p. General Electric, 3 phase, 60 cycle, 2200 volt motors.

2—10-in. Allis-Chalmers, Type S, 3750 G.P.M. at 130-ft. head at 1765 R.P.M., direct connected to 150 h.p. Westinghouse 3 phase, 60 cycle, 2200 volt motors.

6—16-in. Allis-Chalmers, Type S, 8500 G.P.M. at 90-ft. head, direct connected to Type L, 300 h.p., 2000 R.P.M. G.E. Curtis steam turbine.

6—14-in. Allis-Chalmers, Type S, 6500 G.P.M. at 150-ft. head, 8100 G.P.M. at 90-ft. head, direct connected to 300 h.p. 2000 R.P.M. G.E. Curtis steam turbine.

1—20 x 12 x 16 Worthington duplex Underwriters fire pump, 1500 G.P.M., 100 lb. pressure.

200—New and used simplex and duplex, steam driven, Worthington pumps, 4½x3¾x4, 5½x4¾x5, 6x4x6, 7½x4½x10, 6x2½x6.

100—New and used belted 2½", 3", 5", 5", and 6" centrifugal pumps.

Bulletin No. 8 gives complete specifications of all Pumps.

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10—18-in Buffalo Electric Disc Exhaust Fans.
6—24-in. Buffalo Electric Disc Exhaust Fans, Emerson Motors.
28—24-in. Buffalo Electric Disc Exhaust Fans; E. S. C. Motors.
64—30-in. Buffalo Electric Disc Exhaust Fans, Emerson Motors.
18—30-in. Buffalo Electric Exhaust Fans, Sprague Motors.
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4—No. 3 Buffalo Baby Conoidal Fans, Emerson Motors.
15—No. 4 Buffalo Baby Conoidal Fans, Emerson Motors.
All the above equipped with standard A.C. Motors.

BLOWERS—continued.

5—No. 3 Buffalo Niagara Conoidal Fans.
10—No. 4½ Buffalo Niagara Conoidal Fans.
25—No. 6 Buffalo Niagara Conoidal Fans.
15—No. 7 Buffalo Niagara Conoidal Fans.
1—No. 9 Buffalo Niagara Conoidal Fan.
10—No. 4 Buffalo "B" Volume Blowers.
5—No. 5 Buffalo "B" Volume Blowers.
2—No. 6 Buffalo "B" Volume Blowers.
5—No. 8 Buffalo "B" Volume Blowers.
10—No. 1 Low Pressure Gas Exhausters.
10—30-in. Buffalo Standard Reversible Mill Exhausters.
25—50-in. Buffalo Standard Reversible Mill Exhausters.
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2—Connersville Blowers, capacity 3,200 cu. ft. per minute.
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Thousands of pulleys, including pressed steel, split cast iron and solid cast iron, ranging in diameter from 6 to 56 inches, and in width from 2 to 32 inches, are included with the material at Old Hickory.

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1500—New and used steel Tanks, small sizes. Mixing tanks, storage tanks, boiling tanks, pressure tanks, and open tanks.
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Electrical Supplies of all kinds.

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JACKSONVILLE, TENN.

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National Paving Brick Co.

BROKERS—COTTON.
(See Cotton Dealers & Brokers.)

BROKERS—STOCK.
(See Stocks and Bonds.)

BROOMS.
(See Brushes.)

BRUSHES—MILL.
Atlanta Brush Co.
Southwestern Broom Mfg. Co.

BRUSHES—MOTOR AND GENERATOR (COMMUTATOR).
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

BUCKETS AND PAILS—MILL.
Standard Fibre Co.

BUCKETS—ELEVATOR AND GRAB.
Link-Belt Company

BUCKLES—COTTON TIE.
(See Box Strapping and Ties.)

BUILDING CONTRACTORS.
(See Contractors.)

BUILDINGS (ALL STEEL).
Truscon Steel Co.

BUILDING MATERIAL.
Anchor Post Iron Works.
Barrett Co., The
Birmingham Slag Co.
Cornell Wood Products Co.
Dixie Portland Cement Co.
Drouve Co., G.
Dufur & Co.
Hough Shade Corp.
Knapp Fence Co.
Lupton's Sons Co., David.
National Paving Brick Co.
Sanymetal Products Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.
Truscon Steel Co.

BURR PICKERS.
Sargent's Sons, C. G.
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BUSHINGS.
Brown Co., A. & F.
Dodge Sales & Eng. Co.
Southern Spindle & Flyer Co.
Walraven Co.

BUSINESS METHODS.
Ernst & Ernst.

CABINETS.
(See Lockers.)

CALCULATING MACHINES.
Monroe Calculating Mch. Co.

CALENDERS.
Butterworth & Sons Co., H. W.
Textile Finishing Mchry. Co.

CALENDER ROLLS.
(See Rolls—Calender.)

CALLING SYSTEM—INTERTELEPHONE.
Carter Electric Co

CAMLESS DETACHING DEVICES.
Beiger Co.

CANS—ROVING.
Keystone Fibre Co.
O'Malley & Carroll.
Standard Fibre Co.

CAN INDICATORS (ROVING).
O'Malley & Carroll.

CARS AND TRUCKS—FIBRE.
(See Trucks.)

CARBONIZING MACHINES.
Grinnell Co.
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Macomb Machine Co.
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Proctor & Schwartz, Inc.
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CARDING MACHINERY AND SUPPLIES.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
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Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.

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Brooks & Doxey, Ltd.
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Lord Bros.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

CARD FEEDS.
Brooks & Doxey, Ltd.
Lord Bros.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Co.

CARD GRINDING MACHINERY
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.
Whitin Machine Works.

CARPET MACHINERY.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.
Textile Finishing Mchry. Co.

CARRIER APRONS.
(See Aprons.)

CARRIER SYSTEM.
Curtis Pneumatic Machinery Co.

CASES—WOODEN.
(See Boxes.)

CASTINGS.
Briggs, Shaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

CAUSTIC SODA.
(See Bleaching Materials.)

CEILINGS (WOOD PANEL).
Cornell Wood Products Co.

CEMENT.
Dixie Portland Cement Co.

CEMENT REINFORCEMENT.
Birmingham Slag Co.
Truscon Steel Co.

CEMENT AND BRICK COATING.
American Cement Paint Co.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Wadsworth, Howland & Co., Inc.

CENTRAL STATION (ELECTRIC).
Alabama Power Co.
Georgia Railway & Power Co.

CENTRIFUGALS.
Cresson-Morris Co.
Fletcher Works.
Goulds Mfg. Co.
Schaum & Uhlinger.
Tolhurst Mch. Wks.
U. S. & Cuban Allied Works Eng'g Corp.

CHAIN DRIVES.
(See Belting—Chain Link.)

CHAIN—BLOCK, BICYCLE, AUTO, ENGINE, AGRICULTURAL, ETC.)
Morse Chain Co.

CHAIRS AND STOOLS.
Lyon Metallic Mfg. Co.
Manufacturers Equip. & Eng'g Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.
Southern Theatre Equip. Co.

CHECK STRAPS.
Bond Co., Chas.
Jacobs Mfg. Co., E. H.

CHEMICALS.
(See Dyestuffs and Chemicals.)

CHLORINE GAS.
Electro Bleaching Gas Co.

CLEANING MACHINE—BLOWER.
Clements Mfg. Co.

CLEARER CLOTH.
Philadelphia Felt Co.

CLOCKS—HANK, ETC.
(See Counters.)

CLOCKS (TIME).
Silberberg, Mortimer J.

CLOCKS—WATCHMAN.
Foxboro Co., Inc.

CLOSETS—WATER.
(See Toilets.)

CLOTH—ROLLER, CLEARER, SLASHER.
Philadelphia Felt Co.

CLOTH CUTTERS.
Firsching, J. A.
Wildman Mfg. Co.

CLOTH GUIDER (ELECTRIC).
Blake Electric Mfg. Co.

CLOTH REELS.
Gallaudet Aircraft Corp.

CLOTH ROOM MACHINERY.
Brooks & Doxey, Ltd.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Grinnell Co.
Lord Bros.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
Textile Service & Equip. Co.
Williams Co., J. H.
Wildman Mfg. Co.

CLOTH SHRINKING MACHINERY.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Tolhurst Mch Wks.

CLOTH WINDERS.
(See Winders.)

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Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Mason, Volney W.
Wood's Sons Co., T. B.

CLUTCH LININGS.
Brown Co., A. & F.

COAL AND ASH HANDLING MACHINERY.
Link-Belt Company.

COAL TAR DISINFECTANTS.
(See Disinfectants.)

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(See Valves.)

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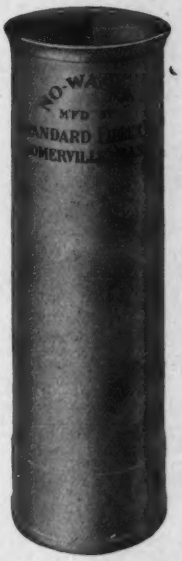

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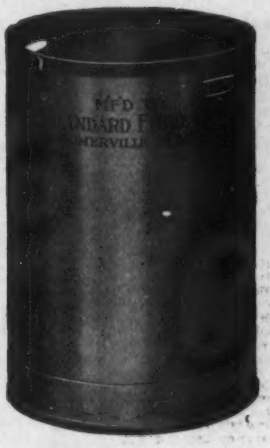

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(See Cotton Cloth Commission Merchants.)

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Allis-Chalmers Mfg. Co.
General Electric Co.
Gould's Mfg. Co.
U. S. & Cuban Allied Works Eng'g Corp.
Walraven Co., The.

COMMUTATOR BRUSHES.
(See Brushes—Motor and Generator.)

CONCRETE REINFORCEMENT.
Birmingham Slag Co.

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Blaw-Knox Co.

CONDENSERS.
Allis-Chalmers Mfg. Co.

CONDUITS.
(See Elec. Machinery & Supplies.)

CONNECTORS—FRANKEL SOLDERLESS.
Westinghouse Elec & Mfg. Co.

CONSULTING ENGINEERS
(See Architects and Engineers.)

CONTRACTORS AND ENGINEERS—BUILDING.
Foundation Co.
Sirrine & Co., J. E.
Stuhrman, Edw. A.
Thompson & Binger, Inc.
Truscon Steel Co.

CONTRACTORS——ELECTRICAL.
(See Electrical Engineers.)

CONTROLLING INSTRUMENTS—TEMPERATURE.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

CONVEYORS—BELT.
(See Belt Conveyors.)

CONVEYING MACHINERY.
American Supply Co.
Chisholm-Moore Mfg. Co.
Collins, J. D.
Cresson-Morris Co.
Curtis Pneumatic Mchry. Co.
Link-Belt Co.
Mason, Volney W.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Schofield, Wm. Co.
Walraven Co.

CONVEYORS—PORTABLE.
Link-Belt Co.

COOLERS.
(See Humidifying Apparatus.)

COOLERS—WATER.
(See Water Coolers.)

COOLING AND CONDITIONING MACHINES.
Grinnell Co.

COOLING TOWERS.
(See Tanks and Towers.)

COPPER STAMPS AND STENCILS.
(See Stamps, Stencils, etc.)

CORDAGE MACHINERY.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The

COST SYSTEMS.
Ernst & Ernst.

COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
Aberfoyle Mfg. Co.
Boger & Crawford
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes.
Flersheim, H. A.
Hunter Mfg. & Comm. Co.
Lane & Co., J. H.
Weimar Bros.
Woodward, Baldwin & Co.

COTTON MERCHANTS AND BROKERS.
Beer, H. & B.

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Atlanta Harness & Reed Mfg. Co.
Barber-Colman Co.
Belger Co.
Blake Electric Mfg. Co.
Brooks & Doxey, Ltd.
Butterworth & Sons, H. W.
Crompton & Knowles Loom Works.
Draper Corporation.
Eclipse Textile Devices, Inc.
Firsching Co., J. A.
Fletcher Works.
Foxboro Co., Inc.
Gal'audet Aircraft Corp.
Greist Mfg. Co.
Grinnell Co.
Howard & Bullough.
Hunt Machine Co., Rodney.
Jacobs Mfg. Co., E. H.
Keystone Fibre Co.
Lestershire Spool & Mfg. Co.
Lord Bros.
Mates-Brown Co., Inc., B. P.
Mossberg Pressed Steel Corp.
O'Malley & Carroll.
Phila. Drying Mchry. Co.
Philadelphia Felt Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Smith & Furbush Mach. Co.
Southern Bending Co.
Stafford Co.
Steel Heddle Mfg. Co.
Suter, Alfred.
Terrell Machine Co.
Textile Finishing Machinery Co.
Textile Specialty Co.
Tolhurst Mch. Wks.
Universal Winding Co.
Vermont Spool & Bobbin Co.
Walraven Co.
Washburn & Sons, L. R.
Williams Co., J. H.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

COTTON TAPE LOOM.
Fletcher Works.
Schaum & Uhlinger.

COTTON YARN MILLS.
(See Yarn Manufacturers.)

COUNTERS—REVOLUTION, HANK, PICK, ETC.
Foxboro Co.

COUNTERS—RESTAURANT.
(See Restaurant Equipment.)

COUPLING—SHAFT.
Cresson-Morris Co.
Wood's Sons Co., T. B.

COVERING—ROLLER.
Bond Co., Chas.
Philadelphia Felt Co.

CRANES.
(See Hoists.)

CREELS (AUTOMATIC).
Suter, Alfred.

CREOSOTED FLOORING, BLOCKS, POSTS, SHINGLES, ETC.
Southern Wood Preserving Co.

CULVERTS.
Dixie Culvert & Metal Co.

CUTTERS—CLOTH.
(See Cloth Cutters.)

CYPRESS LUMBER.
Southern Cypress Mfg. Asso.

CUTTERS—THREAD.
(See Thread Cutters.)

DELIVERY CASES.
(See Boxes—Packing.)

DESKS—FACTORY.
Lupton's Sons Co., David.

DIAL SCALES.
(See Scales.)

DIES—STEEL.
(See Stamps, Stencils, Etc.)

DIE STOCKS.
(See Pipe Threaders.)

DISINFECTANTS.
Barrett Co., The.
Sanitas Co.

DOBBY CHAINS.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

DOFFING BOXES—MILL.
(See Boxes—Mill.)

DOFFING CARS.
(See Cars.)

DOORS—STEEL.
Lupton's Sons Co., David.

DOUBLING MACHINERY.
Brooks & Doxey, Ltd.
Lord Bros.

DRAINAGE ENGINEERS.
Dixie Culvert & Metal Co.

DRAWING FRAMES.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Whitin Machine Works.

DRILLS—ELECTRIC.
(See Electric Machinery.)

DRINKING FOUNTAINS.
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DROP WIRES.
Draper Corp.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
Williams Co., J. H.

DRYING APPARATUS.
Bayley Mfg. Co.
Buckeye Blower Co.
Grinnell Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.

DRYING FORMS—HOSIERY.
Pearson, Jos. T.

DRYING MACHINERY.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
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Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

DUSTING MACHINERY.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

DYERS, BLEACHERS AND FINISHERS.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
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Tolhurst Machine Works.
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Brandwood, John.
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National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
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Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Sumaa Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

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Estes Surgical Supply Co.

ELECTRIC CONDUIT AND FITTINGS.
(See Electrical Machinery and Supplies.)

ELECTRIC DYNAMOS AND MOTORS.
(See Motors and Generators.)

ELECTRIC FANS.
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ELECTRIC LAMP GUARDS.
Flexible Steel Lacing Co.
Ivanhoe Regent Works.

ELECTRICAL ENGINEERS AND CONTRACTORS.
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Huntington & Guerry, Inc.
Ivanhoe Regent Works.

ELECTRIC LIGHTING ENGINEERS.
(See Illuminating Engineers.)

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Bayley Mfg. Co.
Blake Electric Mfg. Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis, Paul W.
Cutter Works, George.
Federal Electric Co.
General Electric Co.
Ivanhoe-Regent Works.
Mason, Volney W.
Walraven Co., The.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

ELECTRIC PRESSES (HIGH PRESSURE).
Rex Eng'g Corp.

ELECTRIC TRACTORS AND TRUCKS.
(See Tractors and Trucks—Electric.)

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Collins, J. D.

ELEVATORS.
Link-Belt Company.

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Estes Surgical Supply Co.

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(See Paint.)

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(See Architects.)

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(See Brokers.)

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(See Blowers and Blowing Systems.)

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(See Boiler Feed Water Purification.)

FEEDERS.
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Bromberg Attractions, Arthur C.
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FILTERS—WATER.
American Water Softener Co.
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(See Dyers, Bleachers and Finishers.)

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Staley Mfg. Co., A. E.
United Chemical Products Corp.
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Wolf & Co., Jacques.

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(See Paint.)

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Southern Wood Preserving Co.

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Southern Wood Preserving Co.

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American Scrubbing Equipment Co.

FLOOR SCRUBBING POWDERS.
India Alkali Works.

FLOOR SWEEPS.
(See Brushes.)

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Miles Refrigerating Co.
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Southern Ice Machine Co.
Taylor, Halsey W.

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(See Clutches—Friction.)

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Federal Electric Co.

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Roy & Son Co., B. S.
Smith & Furbush Mch. Co.

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(See Engines—Gas.)

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Chicago Bridge & Iron Wks.

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Walraven Co.

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Bowser & Co., S. F.

GAUGE (YARN CLEANER).
Mates-Brown Co., Inc., B. P.

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Taylor Instrument Co.

GAUGE—OIL.
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Link-Belt Company.
Morse Chain Co.

GEAR CUTTING AND CUTTERS.
Brown Co., A. & F.
Cresson-Morris Co.

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ARE YOU USING ELEVATORS?

Check waste at the source. This in many cases, begins in unloading and storing materials.

Have you stopped and counted the number of men doing this work? Kept track of the time and the number of bales, boxes, etc., handled? If you do this no doubt you will be surprised.

Doubtless, you will then be interested to know what our "WHIP HOISTS" do and we will be glad to answer questions and tell you where to see them at work.

If you are using an elevator, we can say without qualification that one of our "Whip Hoists" will cut this expense at least one-half.

We can name many mills equipped with elevators that have put in our "Whips," not one but several.

We hope this is of interest and that we may hear from you.

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Let Us Ship You a Barrel Also and You will Be Equally as Well Pleased with Our

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THE SANITAS COMPANY Inc.
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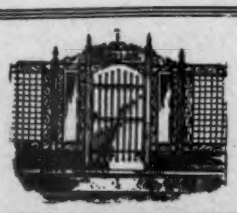

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SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

BUYERS' INDEX—Continued.

GEAR PULLERS.
General Electric Co.

GENERATORS—ELECTRIC.
(See Motors and Generators.)

GLASSWARE AND DISHES.
(See Dishes.)

GLASS SKYLIGHTS.
Drouve Co., G.

GOVERNORS—PUMP.
General Electric Co.

GRAPHIC CHARTS.
Ernst & Ernst.

GRAPHITE.
Dixon Crucible Co., Jos.

GRATES—BOILER.
Cole Mfg. Co., R. D.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

GRATES—MECHANICAL.
(See Stokers.)

GREASE.
(See Lubricants.)

GREASE CUPS.
(See Lubricators.)

GRINDERS—CARD, CYLINDER, ROLL, NAPPER AND GARNET.
(See Card Grinding Machinery)

GUARDS—ELECTRIC LAMP.
(See Electric Lamp Guards.)

GUARDS—MACHINE, SKYLIGHT, WINDOW, ETC.
Knapp Fence Co.

GUIDES—THREAD.
Palmer Co., I. E.

GUIDER—CLOTH-ELECTRIC.
Blake Electric Mfg. Co.

GUMS.
(See Finishing and Sizing Materials.)

HANGERS.
(See Shafting and Hangers.)

HARDWARE—BUILDING.
Sanymetal Products Co.

HARNESS—LOOM.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Works.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.

HEADS—BOBBIN AND SPOOL.
Lestershire Spool & Mfg. Co.

HEATERS.
Bayley Mfg. Co.

HEATING AND VENTILATING APPARATUS.
(See Ventilating Apparatus.)

HEDDLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Steel Heddle Mfg. Co.
Williams Co., J. H.

HEDDLE FRAMES.
Crompton & Knowles Loom Works.
Steel Heddle Mfg. Co.
Williams Co., J. H.

HOISTS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.
Link-Belt Company.
Mason, Volney W.
Morse Chain Co.
Walraven Co.

HOPPER FEEDERS.
(See Automatic Feeders.)

HOSE—FIRE.
Collins, J. D.
Walraven Co.

HOSIERY DYEING MACHINERY.
Cocker Mch. & Fdry. Co.
Cole Mfg. Co., R. D.
Franklin Process Co.
Philadelphia Drying Mchry. Co.

HOSIERY FORMS.
(See Drying Forms.)

HOSIERY YARNS.
(See Yarn Manufacturers.)

HOSPITAL EQUIPMENT AND SUPPLIES.
Estes Surgical Supply Co.

HOTELS.
Hotel Cecil.
Hotel Claridge.
Hotel Martinique.
Hotel Sinton.
Hotel Tuller.

HUMIDIFYING APPARATUS.
American Moistening Co.
Bayley Mfg. Co.
Carrier Eng. Corp.
Grinnell Co.
Parks-Cramer Co.

HUMIDITY INDICATING INSTRUMENTS.
Foxboro Co.
Powers Regulator Co.
Taylor Inst. Co.

HYDROMETERS.
Taylor Instrument Co.

HYDGRODEIKS.
Taylor Instrument Co.

HYDRAULIC TURBINES.
(See Turbines—Hydraulic.)

HYDRO EXTRACTORS.
(See Extractors.)

ICE MACHINES.
Miles Refrigerating Co.
Southern Ice Machine Co.

ILLUMINATING ENGINEERS.
Curtis, Paul W.
Huntington & Guerry.
Ivanhoe-Regent Works.

INDICATING AND RECORDING INSTRUMENTS AND THERMOMETERS.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

INDIGO.
(See Dyestuffs and Chemicals.)

INDICATORS FOR ROVING CANS.
O'Malley & Carroll.

INDUSTRIAL SITES.
Alabama Power Co.
Georgia Ry. & Power Co.
Nashville Industrial Corp.
Texas & Pacific Ry.

INJECTORS.
Lunkenheimer Co.

INK—STENCIL AND MARKING.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

IRON WORK—ORNAMENTAL.
Anchor Post Iron Works.
Chicago Bridge & Iron Wks.
Dufur & Co.
Knapp Fence Co.
Lombard Iron Works & Supply Co.
Royal Metal Mfg. Co.

JACK SPOOLS.
(See Spools.)

JACQUARDS.
Crompton & Knowles Loom Works.

JOINT COMPOUND.
Dixon Crucible Co., Jos.

JUTE BAGGING MACHINE.
Smith & Furbush Machine Co.

KETTLES—SIZE.
(See Size Kettles.)

KETTLES—SODA.
Chicago Bridge & Iron Wks.
Lombard Iron Works & Supply Co.

KIERS.
(See Bleaching Kiers.)

KNIT GOODS.
(See Cotton Cloth Commission Merchants and Dealers)

KNIT GOODS WASHERS.
(See Washers—Cloth.)

KNITTING MACHINERY AND SUPPLIES.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Scott & Williams.
Trump Bros. Machine Co.
Wildman Mfg. Co.

LABORATORY INSTRUMENTS AND THERMOMETERS.
Estes Surgical Supply Co.
Foxboro Co.
Taylor Instrument Co.

LACING—BELT.
(See Belt Lacing.)

LAMPS—INCANDESCENT AND ARC.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis, Paul W.
Cutter Works, George.
General Electric Co.
Ivanhoe-Regent Works of G. E. Co.
Walraven Co.
Westinghouse Elec. & Mfg. Co.

LAMP GUARDS—KEY LOCKING.
(See Electric Lamp Guards.)

LAMP REFLECTORS.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis, Paul W.
Cutter Works, George.
Ivanhoe-Regent Works of G. E. Co.
Westinghouse Elec. & Mfg. Co.

LANDSCAPE ARCHITECTS.
(See Village Architects.)

LAPPERS.
Brooks & Doxey, Ltd.
Lord Bros.
Saco-Lowell Shops.
Smith & Furbush Mch. Co.
Whitin Machine Works.

LAUNDRY MACHINERY.
American Laundry Mchry. Co.
Fletcher Works.
Hunt Machine Co., Rodney.
Schaum & Uhlinger.
Tolhurst Machine Works.

LAVATORIES.
Crane Co.
Vogel Co., Jos. A.

LEATHER BELTING.
(See Belting.)

LEATHER SPECIALTIES.
American Supply Co.
Bond Co., Chas.
Jacobs Mfg. Co., E. H.
Williams & Sons, I. B.

LIGHTS—FLOOD.
Cutter Works, George.
Cooper Hewitt Electric Co.
General Electric Co.
Ivanhoe-Regent Works.
Westinghouse Elec. & Mfg. Co.

LIGHTING ENGINEERS AND CONTRACTORS.
(See Illuminating Engineers.)

LINEN YARNS.
(See Yarns—Linen.)

LINK BELTING.
(See Belting—Link.)

LINTERS.
(See Waste Dealers.)

LIQUID CHLORINE.
(See Chlorine.)

LOADERS—WAGON AND TRUCK.
Link-Belt Company.

LOCKERS—METAL.
Collins, J. D.
Lupton Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturers Equip. & Eng. Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

LOGWOOD EXTRACT.
(See Dyestuffs and Chemicals.)

LOOMS.
Crompton & Knowles Loom Works.
Draper Corporation.
Fletcher Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.
Textile Service & Equip. Co.

LOOM ATTACHMENTS—AUTOMATIC.
Draper Corporation.

LOOM HARNESS.
(See Harness.)

LUBRICANTS.
D-A Lubricant Co.
Dixon Crucible Co., Jos.
Lamson Oil Co., Inc.
Masury-Young Co.
Moore Oil Refining Co.
N. Y. & N. J. Lubricant Co.
Texas Co.

LUBRICATORS.
Bowser & Co., S. F.
Lidseen.
N. Y. & N. J. Lubricant Co.

LUG STRAPS.
(See Straps—Lug.)

LUMBER.
Cornell Wood Products Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

LUNCH ROOM EQUIPMENT.
(See Restaurant.)

MACHINE TOOLS.
(See Tools.)

MACHINISTS.
Briggs-Shaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works.

MARKET SERVICE.
Textile Service & Equip. Co.

MARKING POTS, STENCILS, INKS, ETC.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

MERCERIZED YARNS.
(See Yarn Manufacturers).

MERCERIZERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

MERCERIZED YARN.
Aberfoyle Mfg. Co.
American Yarn & Pro. Co.
Boger & Crawford Co.
Dixie Mercerizing Co.
Hunter Mfg. & Comm. Co.

MERCERIZING MACHINERY.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

METAL CEILINGS, ETC.
Lupton's Sons Co., David.
Truscon Steel Co.

METALS—PERFORATED.
(See Screens and Sieves.)

METERS—FLOW, AIR, GAS, ELECTRIC, STEAM, ETC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

METERS—COUNTING.
(See Counters.)

MILL BASKETS AND BOXES.
(See Boxes—Mill.)

MILL ENGINEER.
(See Architects and Engineers.)

MILL VILLAGES.
(See Villages.)

MILL SUPPLIES—MISCELLANEOUS.
(See Supplies—Mill.)

MILL WHITE PAINT.
(See Paint.)

MOPS.
Atlanta Brush Co.
Southwestern Broom Mfg. Co.

MOTION PICTURES.
(See Films.)

MOTORS AND GENERATORS—ELECTRIC.
Allis-Chalmers Mfg. Co.
Carter Electric Co.
Curtis, Paul W.
General Electric Co.
Nashville Industrial Corp.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.

MOVING PICTURE MCH. AND SUPPLIES.
(See Theatre Equipment or Films).

NAPPERS.
Roy & Son Co., B. S.

OFFICE EQUIPMENT & SUPPLIES.
Byrd Printing Co.
Dowman-Wilkins Ptg. Co.
Carter Electric Co.
Knapp Fence Co.
Lupton's Sons Co., Davd.
Manufacturers Equip. & Eng. Co.
Monroe Calculating Mch. Co.
Royal Metal Mfg. Co.
Smith & Bros. Typewriter Co.
Sanymetal Products Co.

OFFICE PARTITIONS.
Knapp Fence Co.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Sanymetal Products Co.

OIL—LUBRICATING.
D-A Lubricant Co.
Johnson & Co., Inc., Oliver.
Lamson Oil Co., Inc.
Masury-Young Co.
Moore Oil Refining Co.
Texas Co.
Wadsworth, Howland & Co., Inc.

OIL ENGINES.
(See Engine Oil.)

OIL FILTERS.
Burt Mfg. Co.

OILS—FINISHING.
(See Finishing and Sizing Materials.)

OIL CANS.
Lidseen.

OIL CUPS.
(See Lubricators.)

OIL PAPER.
Bradley Mfg. Co., A. J.

OIL STORAGE TANKS AND PUMPS.
Bowser & Co., S. F.

OILING DEVICES.
(See Lubricators.)

OPENERS FOR COTTON, WOOL, WASTE, ETC.
Brooks & Doxey, Ltd.
Lord Bros.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

OVERHEAD CARRIERS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.

OXIDIZING MACHINERY.
Phila. Drying Machinery Co.

OXYGEN.
Bird-Potts Co., Inc.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co.
Standard Gas Products Co.

PACKING BOXES AND CASES—WOODEN.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lewis Co., G. B.
Walke Box Co., Inc.

PACKINGS.
Jenkins Bros.
Walraven Co.

PAINT.
American Cement Paint Co.
Barrett Co., The.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Oliver.
Wadsworth, Howland & Co., Inc.

PAINTING CONTRACTORS.
(See Contractors.)

PANEL BOARDS.
(See Switchboards.)

PAPER.
Bradley Mfg. Co., A. J.

PARTITIONS—STEEL AND WIRE.
Knapp Fence Co.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Sanymetal Products Co.

PERBORATE OF SODA.
Roessler & Hasslacher Chemical Co.

PERFORATED METAL.
(See Screens and Sieves.)

PEROXIDES.
Roessler & Hasslacher Chemical Co.

PICKERS—CURLED HAIR.
Schofield Co., Wm.
Smith & Furbush Machine Co.

PICKERS—LEATHER.
Bond Co., Chas.
Garland Mfg. Co.

PICKER STICKS.
Garland Mfg. Co.
Southern Bending Co.
Walraven Co.

PICKING MACHINERY.
Brooks & Doxey, Ltd.
Howard & Bullough Am. Machine Co.
Lord Bros.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

PINIONS.
General Electric Co.

PIPE (STEEL RIVETED).
Chicago Bridge & Iron Wks.

PIPE AND PIPE FITTINGS.
Chicago Bridge & Iron Wks.
Crane Co.
East Jersey Pipe Co.
Grinnell Co.
Parks-Cramer Co.
Scaife & Sons Co., Wm. B.
Walraven Co.

PIPE DRAINAGE.
Dixie Culvert & Metal Co.

PIPE JOINT COMPOUND.
Dixon Crucible Co., Jos.

PIPE THREADING AND CUTTING MACHINES.
Oster Mfg. Co.
Walraven Co., The.

PIPING ENGINEERS.
Grinnell Co.

PIPE BENDING.
Grinnell Co.

PIPING (POWER & PROCESS).
Grinnell Co.

PLAYGROUND APPARATUS & EQUIPMENT.
Crane Co.
Manufacturers Equip & Eng. Co.
Royal Metal Mfg. Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.

PNEUMATIC MACHINERY & TOOLS.
Curtis Pneumatic Mchry. Co.

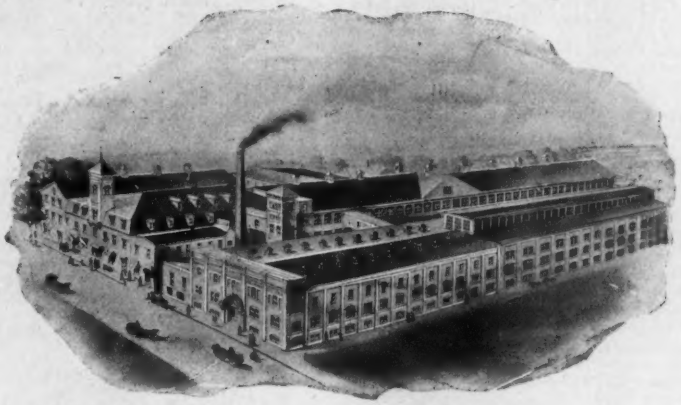
PORTABLE CONVEYORS.
(See Conveyor.)

POSTS—FENCE (WOOD).
Southern Wood Preserving Co.

POWER—ELECTRIC.
Alabama Power Co.
Georgia Ry. & Power Co.

POWER TRANSMISSION.
Aldrich Machine Works.
Allis-Chalmers Mfg. Co.
Bond Co., Chas.
Brown Co., A. & F.
Carlyle-Johnson Mch. Co.
Columbia Novelty Mfg. Co.
Cresson-Morris Co.
Dixon Crucible Co., Jos.
Fabreeka Belting Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
General Electric Co.
Grinnell Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Morse Chain Co.
Skayef Ball Bearing Co.
U. S. Ball Bearing Co.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

PRESERVATIVE PAINT FOR METAL WORK.
(See Paints.)



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There is no longer any need to discard good fabric because of oil stains. A few drops of "REMOVOIL" on the spot—a little rubbing and it disappears. If the goods are going direct to the bleachery, no rubbing is necessary as the oil stain is removed in the bleach.

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"Our Success Represents Confidence Won by Integrity."

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Established 1857. **Boston, Mass.**

GEORGE F. BAHAN, Southern Representative

BUYERS' INDEX—Continued.

PRESSED STEEL.
Lupton's Sons Co., David.

PRESSES.
American Laundry. Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Famous Mfg. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Mach ne Works.
Rex Eng'g Corp.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

PRESSURE REGULATORS.
(See Regulators—Pressure.)

PRINTING.
Byrd Printing Co.
Dowman Wilk ns Printing Co.
Showalter Printing Co., A. J.

PULLEYS.
Brown Co., A. & F.
Cole Mfg. Co., R. D.
Dodge Sales & Eng. Co.
Cresson-Morris Co.
Link-Belt Company.
Mason, Volney W.
Walraven Co., The.
Wood's Sons Co., T. B.

PULLEY COVERING.
Williams & Sons, I. B.

PUMPS.
Allis-Chalmers Mfg. Co.
Bowser & Co., S. F.
Goulds Mfg. Co.
Sydnor Pump & Well Co., Inc.
Toomey, Frank.
U. S. & Cuban Allied Works, Eng'g Corp.
Walraven Co.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

PUMPS—OIL.
Bowser & Co., S. F.
Lunkenheimer Co.

PUMP VALVES.
(See Valve Discs.)

PYROMETERS.
Foxboro Co.
Taylor Instrument Co.

QUILLS.
Jordan Mfg. Co.

QUILL CLEANING MACHINES.
Terrell Machine Co.

RAILWAYS.
A. B. & A. Ry.
A. & W. P. Ry.
Georgia Railroad.
Southern Railway System.
Texas & Pacific Ry.

RAW STOCK DRYING SYSTEMS.
Brandwood, John.

RECEPTACLES—FIBRE.
(See Fibre Products.)

RECORDING INSTRUMENTS.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

REEDS.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Emmons Loom Harness Co.
Walraven Co.

REELS.
Crompton & Knowes Loom Works.
Draper Corporation.
Gallaudet Aircraft Corporation.
Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMP.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

REGULATORS—PRESSURE.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

REGULATORS—TEMPERATURE.
(See Temperature Controllers.)

REINFORCING SLAG.
Birmingham Slag Co.

REPAIRING—ELECTRICAL.
Briggs-Shaffner Co.
Curtis, Paul W.
Westinghouse Elec. & Mfg. Co.

REPAIRING—TEXTILE MACHINERY, ETC.
Bird-Potts Co., Inc.
Briggs-Shaffner Co.
General Machine Works.
Southern Spindle & Flyer Co.
Standard Gas Products Co.

RESTAURANT EQUIPMENT.
Sanymetal Products Co.

RIBBERS.
(See Knitting Machinery.)

RIB TOP CUTTERS.
General Machine Works.
Wildman Mfg. Co.

RING TRAVELERS—STEEL AND BRONZE.
Whitinsville Spinning Ring Co.
Whitin Machine Works.

RINGS—SPINNING.
(See Spinning Rings.)

ROCKER SHAFT BEARINGS.
(See Bearings.)

ROLLS—CALENDER.
Brooks & Doxey, Ltd.
Butterworth & Sons Co., H. W.
Lord Bros.
Roy & Son Co., B. S.
Textile Finishing Mchry. Co.
Washburn & Sons, L. R.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W.
Textile Finishing Mchry. Co.
Washburn & Sons, L. R.

ROLLS—STEEL.
Brooks & Doxey, Ltd.
Butterworth & Sons Co., H. W.
Lord Bros.
Southern Spindle & Flyer Co.
Textile Finishing Mchry Co.
Washburn & Sons, L. R.

ROLLS (WOODEN).
Washburn & Sons, L. R.

ROLLER CLOTH.
Philadelphia Felt Co.

ROLLER LEATHER.
Bond & Co., Chas.

ROLL WASTE PACKERS.
Belger Co.

ROOFING.
Barrett Co., The.
Cortright Metal Roofing Co.
Southern Wood Preserving Co.
Wadsworth, Howland & Co.
Walraven Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Cresson-Morris Co.
Link-Belt Company.
Walraven Co.

ROPE SHEAVES.
Brown Co., A. & F.

ROVING CANS.
(See Cans—Roving.)

ROVING CAN INDICATORS.
O'Malley & Carroll.

ROVING MACHINERY.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Whitin Machine Works.

RUBBER GOODS.
Estes Surgical Supply Co.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

SALAMANDERS.
Drouve Co., G.

SANITARY PRODUCTS.
Crane Co.
Dixie Culvert & Metal Co.
Estes Surgical Supply Co.
Manufacturers Equip. & Eng. Co.
Rundle-Spence Mfg. Co.
Sanitas Co.
Sanymetal Products Co.
Taylor, Halsey W.
Vogel Co., Jos. A.

SASH-WINDOW—STEEL.
Drouve Co., G.
Lupton's Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.

SASH OPERATOR.
Drouve Co., G.

SCALE PREVENTER—BOILER.
(See Boiler Feed Water Purification.)

SCHOOLS (TEXTILE).
Philadelphia Textile School.

SCREENS—MOVING PICTURE.
Southern Theatre Equip. Co.

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link-Belt Company.

SCOURING MACHINERY.
(See Washers—Cloth.)

SCRUBBING MACHINE—FLOOR.
American Scrubbing Mach. Co.

SCRUBBING AND WASHING POWDERS.
India Alkali Works.
Warren Soap Mfg. Co.

SCUTCHERS.
Brooks & Doxey, Ltd
Lord Bros.
Whitin Machine Works.

SECOND HAND MACHINERY AND SUPPLIES
Nashville Industrial Corp.
Textile Service & Equip. Co.
Toomey, Frank, Inc.
Walraven Co.

SELVAGE HARNESS.
(See Harness.)

SEWING MACHINES.
Merrow Machine Co., The.
Textile Finishing Mchry. Co.

SHADES—ELECTRIC LAMP.
(See Reflectors.)

SHADES (WINDOW).
Hough Shade Corp.

SHAFTING AND HANGERS.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Fafnir Bearing Co.
Grinnell Co.
Link-Belt Co.
Shaw'd Ball Bearing Co.
Walraven Co., The.
Wood's Sons Co., T. B.

SHEARS.
Roy & Sons Co., B. S.

SHELVING—SECTIONAL STEEL.
Collins, J. D.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturers Equip. & Eng. Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

SHINGLES—ASPHALT.
Barrett Co.

SHINGLES—METAL.
Cortright Metal Roofing Co.

SHINGLES—WOOD.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

SHIPPING ROOM MACHINERY AND SUPPLIES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Collins, J. D.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Royal Metal Mfg. Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.
Walraven Co., The.
Walke Box Co., Inc.

SHOWER BATHS AND CABINETS.
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Lyon Metallic Mfg. Co.
Sanymetal Products Co.

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Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
Southern Bending Co.
Walraven Co.
Williams Co., J. H.

SICK ROOM SUPPLIES.
Estes Surgical Supply Co.

SIGNS—ELECTRIC.
Federal Electric Co.

SINGEING MACHINERY.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

SIREN.
Brown Co., A. & F.
Federal Electric Co.

SITES FOR FACTORIES.
(See Industrial Sites.)

SIZE BOX TEMPERATURE CONTROLLER.
Foxboro Co.
Powers Regulator Co.

SIZE KETTLES.
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Hauser-Stander Tank Co.
Howard & Bullough American Machine Co.
Lombard Iron Wks. & Sup. Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SIZING AND FINISHING COMPOUNDS.
(See Finishing and Sizing Materials.)

SKEWERS.
Jordan Mfg. Co.

SKYLIGHTS.
Drouve Co., G.
Lupton's Sons Co., David.

SKYLIGHT GUARDS.
Knapp Fence Co.

SLAG FOR CONCRETE.
Birmingham Slag Co.

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Butterworth & Sons Co., H. W.
Cocker Mch. & Fdry. Co.
Cole Mfg. Co., R. D.
Howard & Bullough.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SLASHER CLOTH.
Philadelphia Felt Co.

SLASHER HOODS.
Cole Mfg Co., R. D.

SLASHER TAPE.
(See Tape—Slasher.)

SLATE ASPHALT ROOFING.
Barrett Co.

SLIDING PARTITION HARDWARE.
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Lyon Metallic Mfg. Co.
Manufacturers Equip. & Eng. Co.
Sanymetal Products Co.

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Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Whitin Machine Works.

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Chicago Bridge & Iron Wks.

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Arnold, Hoffman & Co.
Borne, Scrymser Co.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Aluminum Co.
India Alkali Wks.
Kali Mfg. Co.
Mates-Brown Co., Inc., B. P.
Newport Chemical Works.
Sonneborn Sons, Inc., L.
Stearns, Wm. Taylor.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

SODA—TEXTILE, SODA ASH AND BOILING.
Sonneborn Sons, Inc., L.

SOFTENERS—COTTON.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Ford Co., J. B.
Grasselli Chemical Co.
Kali Mfg. Co.
Mates-Brown Co., Inc., B. P.
Moore Oil Refining Co.
Newport Chemical Works.
Roessler & Hasslacher Chemical Co.
Sonneborn Sons, Inc., L.
United Chemical Prod. Corp
Wolf & Co., Jacques.

SOFTENERS—WATER.
(See Water Softeners.)

SOLDERLESS CONNECTORS—FRANKEL.
Westinghouse Elec. & Mfg. Co.

SOLOZONE.
Roessler & Hasslacher Chem. Co.

SOLVENTS.
(See Finishing.)

SPEEDERS.
Jordan Mfg. Co.
Vermont Spool & Bobbin Co.

SPEEDOMETERS.
(See Counters.)

SPINDLES.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Vermont Spool & Bobbin Co.
Whitin Machine Works.

SPINNERS.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Arkray Mills, Inc.
Arlington Cotton Mills.
Arrow Mills, Inc.
Boger & Crawford.
Flint Mfg. Co.
Fletcher Works.
Florsheim, H. A.
Gray Mfg. Co.
Hunter Mfg. & Comm. Co.
Myrtle Mills, Inc.
Philadelphia Felt Co.
Parkdale Mills, Inc.

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American Machine Co., H. & B.
Crompton & Knowles Loom Works.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Schaum & Uhlinger.
Saco-Lowell Shops.
Whitin Machine Works.

SPINNING RINGS.
Brooks & Doxey, Ltd.
Draper Corporation.
Howard & Bullough.
Greist Mfg. Co.
Lord Bros
Whitin Machine Works.
Whitinsville Spinning Ring Co.

SPINNING TAPE SPECIALISTS.
American Textile Banding Co., Inc.
Barber Mfg. Co.

SPOOLING MACHINERY AND SUPPLIES.
Draper Corporation.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

SPOOLER TENSIONING DEVICE.
Textile Specialty Co.

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Jordan Mfg. Co.
Lestershire Spool & Mfg. Co
Mossberg Pressed Steel Corp'n.
Vermont Spool & Bobbin Co.
Walraven Co.

SPRINKLER SYSTEMS.
Grinnell Co.

SPRINKLER TANKS.
(See Tanks, Towers, Etc.)

SPROCKETS.
Link-Belt Company.
Morse Chain Co.

SPUR CAP SHELLS.
Gallaudet Aircraft Corporation.

STAMPS, STENCILS AND STENCIL MACHINES.
Atlanta Stamp & Stencil Wks
Bradley Mfg. Co., A. J.

STAND PIPES.
(See Tanks.)

STARCH AND GUMS.
(See Finishing and Sizing Materials.)

STEAM ENGINES.
(See Engines—Steam.)

STEAM HOSE.
(See Hose—Fire.)

STEAM PUMPS.
(See Pumps—Steam.)

STEAM TRAPS.
(See Traps—Steam.)

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Chicago Bridge & Iron Wks.

STEEL RIVETED PIPE.
Chicago Bridge & Iron Wks.

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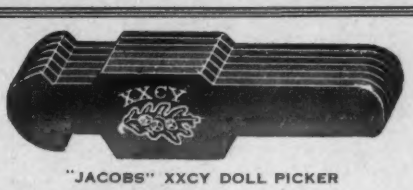

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(See Stamps and Stencils.)

STENCIL BRUSHES.
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STENCIL CUTTING MACHINES
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

STICKS—PICKER.
(See Picker Sticks..)

STOOLS.
(See Chairs.)

STOP WATCHES.
Silberberg, Mortimer J.

STOP MOTION.
Crompton & Knowles Loom Works.
Draper Corporation.
Eclipse Textile Devices, Inc.
Textile Specialty Co.
Whitin Machine Works.
Wildman Mfg. Co.

STOKERS.
Westinghouse Elec. & Mfg. Co.

STORAGE RACKS.
(See Shelving.)

STRAPS (LUG, CHECK, HEEL, TUGGER, PICKER HARNESS, ETC.)
Bond & Co., Chas.
Jacobs Mfg. Co., E. H.
Garland Mfg. Co.

STRAPPING.
(See Leather Specialties or Check Straps.)

STREET LIGHTING FIXTURES.
Cutter Works, George.

SULPHUROUS ACID GENERATOR.
Macomb Machine Co.

SUPPLIES—GENERAL MILL.
Atlanta Harness & Reed Co.
Brown, A. & F.
Jacobs Mfg. Co., E. H.
Jenkins Bros.
Jordan Mfg. Co.
Nashville Industrial Corp.
Steel Heddle Mfg. Co.
Vermont Spool & Bobbin Co.
Walraven Co., The.

SURGICAL SUPPLIES.
Estes Surgical Supply Co.
Taylor Instrument Co.

SWITCHES—KNIFE-ELEC.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

SWITCHBOARDS—PANEL.
Cutter Co., George
General Electric Co.
Westinghouse Elec. & Mfg. Co.

SYSTEMS (BUSINESS).
Ernst & Ernst.

TABLES, CHAIRS, ETC.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturers Equip. & Eng. Co.
Royal Metal Mfg. Co.
Sanymetal Products Co.

TALLOW.
(See Finishing Machinery.)

TANKS—OIL, GASOLINE, PAINT, ETC.
Bowser & Co., S. F.

TANKS (ELEVATED).
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R. D.
Lombard Iron Works.
Walsh & Weidner Boiler Co.

TANKS (SPRINKLER).
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R. D.
Grinnell Co.
Lombard Iron Works.

TANKS (STEEL STORAGE).
Chicago Bridge & Iron Wks.
Cole Mfg. Co., R. D.
Grinnell Co.
Lombard Iron Works.
Walsh & Weidner Boiler Co.

TANKS (WOODEN).
Chicago Bridge & Iron Wks.
Grinnell Co.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz.
Textile Finishing Mchry. Co.

TAPE LOOMS—COTTON.
Fletcher Works.
Schaum & Uhlinger.

TAPES AND BRAIDS.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

TAPES—SPINNING AND TWISTING.
Barber Mfg. Co.

TAPE MAKING MACHINES.
(See Bandage and Tape Machinery.)

TAX SERVICE.
Ernst & Ernst.

TELEPHONE—CALLING SYSTEM.
Carter Electric Co.
General Electric Co.

TEMPERATURE REGULATORS
Carrier Eng. Corp.
Foxboro Co., Inc.
General Electric Co.
Parks-Cramer Co.
Powers Regulator Co.
Taylor Instrument Co.

TEMPLES.
Draper Corporation.

TENTERS.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

TENTER FRAME GUIDER—ELECTRIC.
Blake Electric Mfg. Co.

TENSION DEVICE FOR SPOOLERS.
Textile Specialty Co.

TENTER HOUSING & RECONSTRUCTING SYSTEM.
Proctor & Schwartz, Inc.

TEXTILE MACHINERY.
(See Cotton Mill Machinery.)

THEATRE EQUIPMENT.
Southern Theatre Equip. Co.

THERMOMETERS—ANGLE AND STRAIGHT STEM.
Foxboro Co.
Taylor Instrument Co.

THERMOMETERS—RECORDING AND INDEX.
Foxboro Co.
Taylor Instrument Co.

THERMOSTATS.
Foxboro Co.
Powers Regulator Co.

THIN PLACE PREVENTERS.
Draper Corporation.

THREAD EXTRACTORS.
Brooks & Doxey, Ltd.
Lord Bros.

THREAD GUIDES.
Palmer Co., The I. E.
Textile Specialty Co.

TILE & BRICK.
National Paving Brick Co.

TIME CLOCKS.
(See Clocks.)

TIERING MACHINES.
Collins, J. D.

TIES—BALING.
(See Bale Ties.)

TIRE FABRIC EQUIPMENT.
Textile Service & Equip. Co.

TOILETS.
Crane Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

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Lupton's Sons Co., David
Manufacturers Equip. & Eng. Co.
Sanymetal Products Co.

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Lupton's Sons Co., David.
Manufacturers Equip. & Eng. Co.

TOOL STANDS—STEEL.
Lupton's Sons Co., David.
Royal Metal Mfg. Co.

TOOLS—ALL KINDS.
Walraven Co., The.

TOWERS.
(See Tanks—Elevated.)

TRACTORS—ELECTRIC, INDUSTRIAL.
Collins, J. D.

TRANSMISSION—POWER.
(See Power Transmission Machinery.)

TRAPS—RETURN STEAM.
Morehead Mfg. Co.

TROLLEYS & HOISTS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Mchry. Co.

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Packard Motor Car Co.
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Lewis Co., G. B.
Lyon Metallic Mfg. Co
Standard Fibre Co.

TRUCKS—ELECTRIC—INTER.
Collins, J. D.

TRUCKS—HAND AND ELEVATING.
Collins, J. D.

TRUCKS—INTER, ETC.
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Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Standard Fibre Co.

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Estes Surgical Supply Co.

TUBS.
(See Tanks—Woolen.)

TURBINES—HYDRAULIC.
Allis-Chalmers Mfg. Co.
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Westinghouse Elec. & Mfg. Co.

TURBINE—STEAM.
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Howard & Bullough.
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Smith & Bros. Typewriter Co.

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Crane Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

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Crane Co.
Jenkins Bros.

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Cresson-Morris Co.

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VALVES—NON-RETURN STOP.
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Walraven Co.

VARNISHES.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co., Inc.

VATS.
(See Tanks—Wooden.)

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Bayley Mfg. Co
Buckeye Blower Co.
Burt Mfg. Co.
Carrier Eng. Corp.
Drouve Co., G.
General Electric Co.
Grinnell Co.
Hough Shade Corp.
Parks-Cramer Co.
Philadelphia Drying Mchry. Co.
Sargent's Sons Co., C. G.
Tolhurst Machine Co.

VENTILATING WINDOW SHADES.
Hough Shade Corp.

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Sterne, J. E.
Stubbman, Edw. A.

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(See Houses—Ready-Built.)

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Curtis Pneumatic Mchry. Co.

WALL BOARD.
Cornell Wood Products Co.

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(See Buildings.)

WAREHOUSE DOOR HARDWARE.
(See Doors and Hardware.)

WAREHOUSE TRUCKS.
(See Trucks.)

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Brooks & Doxey, Ltd.
Draper Corporation.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

WASH BASINS.
(See Lavatories.)

WASHERS—CLOTH.
American Laundry Mchry. Co
Butterworth & Sons Co., H. W.
Hunt Machint Co., Rodney.
Klauder-Weldon Dyeing Mch. Co
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Mchry. Co.
Tolhurst Mch. Wks.

WASHING POWDERS—FLOOR.
India Alkali Works.

WASTE BINS—STEEL.
Lupton's Sons Co., David.

WASTE MACHINERY—COTTON.
Brooks & Doxey, Ltd.
Howard & Bullough.
Lord Bros.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Co.

WATCHES (TIME & STOP).
Silberberg Co., Mortimer J.

WATCHMAN CLOCKS.
(See Clocks—Watchman.)

WATER COOLERS—FOUNTAIN.
Crane Co.
Manufacturers Equip. & Eng. Co.
Miles Refrigerating Co.
Rundle-Spence Mfg. Co.
Southern Ice Machine Co.
Taylor, Halsey W.

WATER SOFTENERS AND PURIFIERS.
American Water Softener Co.
Norwood Engineering Co.
Scaife & Sons Co., Wm. B.

WATER SUPPLY SYSTEM.
Sydnor Pump & Well Co., Inc.

WATER TOWERS.
(See Tanks—Elevated.)

WATERPROOFING MACHINERY.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co., The.

WEAVING.
(See Yarn Manufacturers.

WELDING APPARATUS—ELECTRIC ARC.
Bird-Potts Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

WELDING APPARATUS AND SUPPLIES—OXY-ACETYLENE.
Bird-Potts Co., Inc.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co.
Standard Gas Products Co.

WELDING—JOB.
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Briggs-Shaffner Co.
Grinnell Co.
Standard Gas Products Co.

WELFARE ARCHITECTS.
(See Village Architects.)

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Cornell Wood Products Co.
Crane Co.
Cutter Works, George.
Dixie Culvert & Metal Co.
Estes Surgical Supply Co.
Manufacturers Equip. & Eng.
Royal Metal Mfg. Co.
Rundle-Spence Mfg. Co.
Sanitas Co.
Southern Ice Machine Co.
Southern Theatre Equip. Co.
Taylor, Halsey W.
Westinghouse Elec. & Mfg. Co.

WELL DRILLING.
Sydnor Pump & Well Co., Inc.

WHEELS—FIBRE.
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WHEEL PULLER.
General Electric Co.

WHIP HOISTS.
Mason, Volney W.

WHISTLES—STEAM AND AIR.
Brown Co., A. & F.
Crane Co.
Jenkins Bros.

WHISTLES—ELECTRIC SIREN.
Federal Electric Co.

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East Jersey Pipe Co.
Fletcher Works.
Tolhurst Mach. Wks.
U. S. & Cuban Allied Works, Eng'g Corp.

WINDERS.
Brooks & Doxey, Ltd.
Firsching, J. A.
Howard & Bullough American Machine Co.
Lord Bros.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Universal Winding Co.

WINDOW FRAMES AND SASH—STEEL.
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Lupton's Sons Co., David.
Truscon Steel Co.

WINDOW GUARDS.
Knapp Fence Co.

WINDOW SASH—STEEL.
Drouve Co., G.
Lupton's Sons Co., David.

WINDOW SHADES.
Hough Shade Corp.

WIRES—DROP.
(See Drop Wires.)

WIRE HEDDLES.
(See Heddles.)

WIRING CONDUITS AND FITTINGS.
(See Electric Machinery and Supplies.)

WIRING—ELECTRICAL.
(See Electrical Contractors.)

WIRE PARTITIONS AND GUARDS.
Knapp Fence Co.

WOOD.
(See Lumber.)

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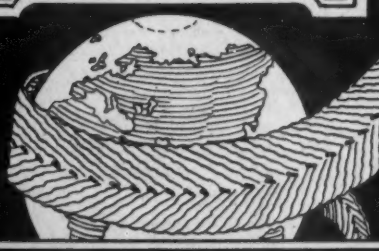

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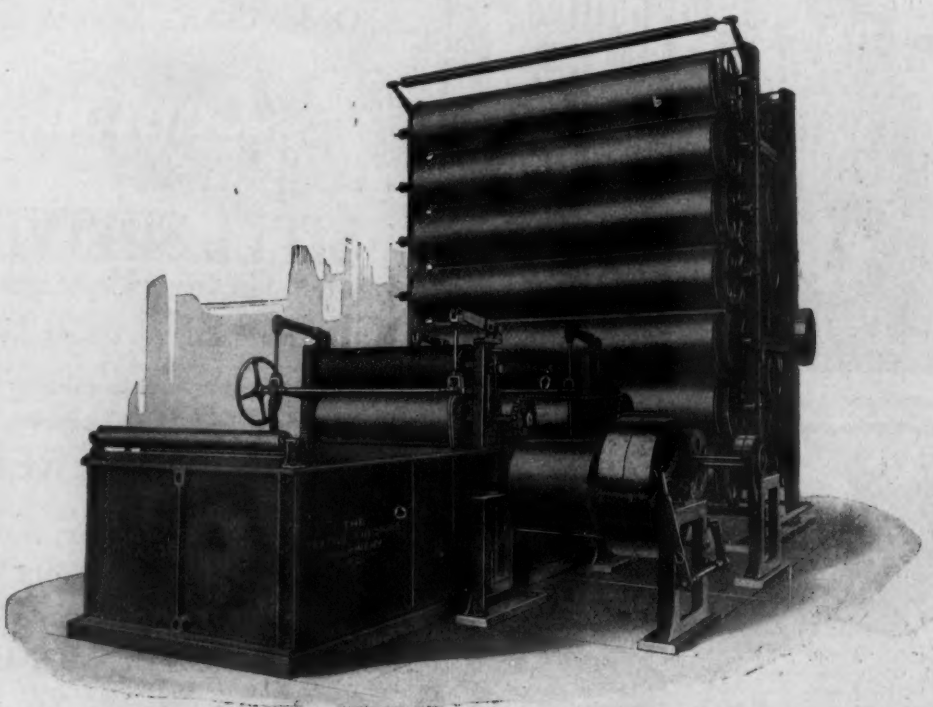

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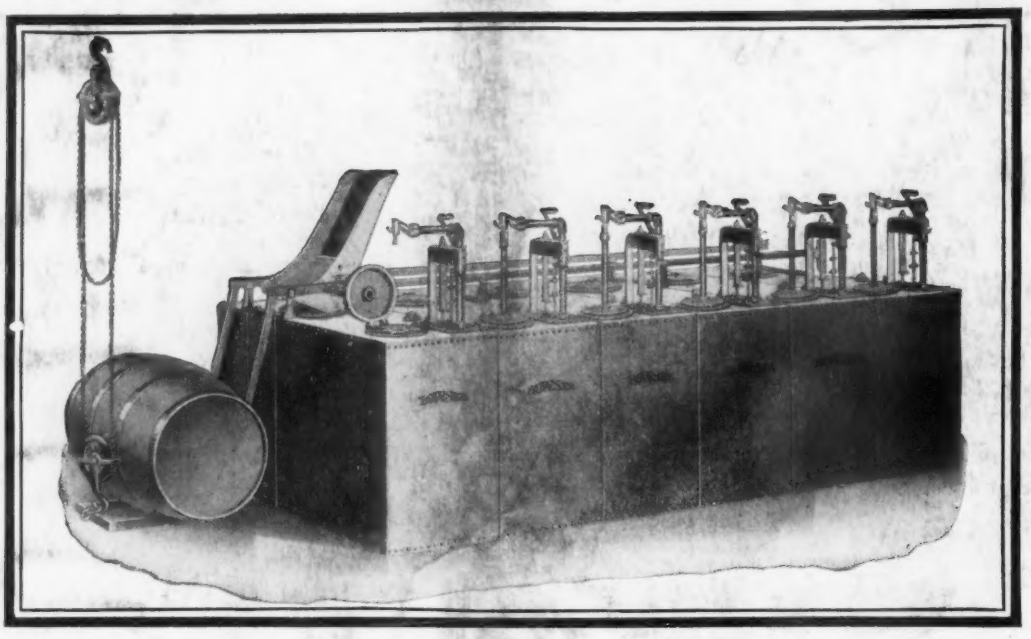

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